SOUTHERN POWER AND INDUSTRY

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NOVEMBER, 1950

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ENGINEERING REFERENCE DATA

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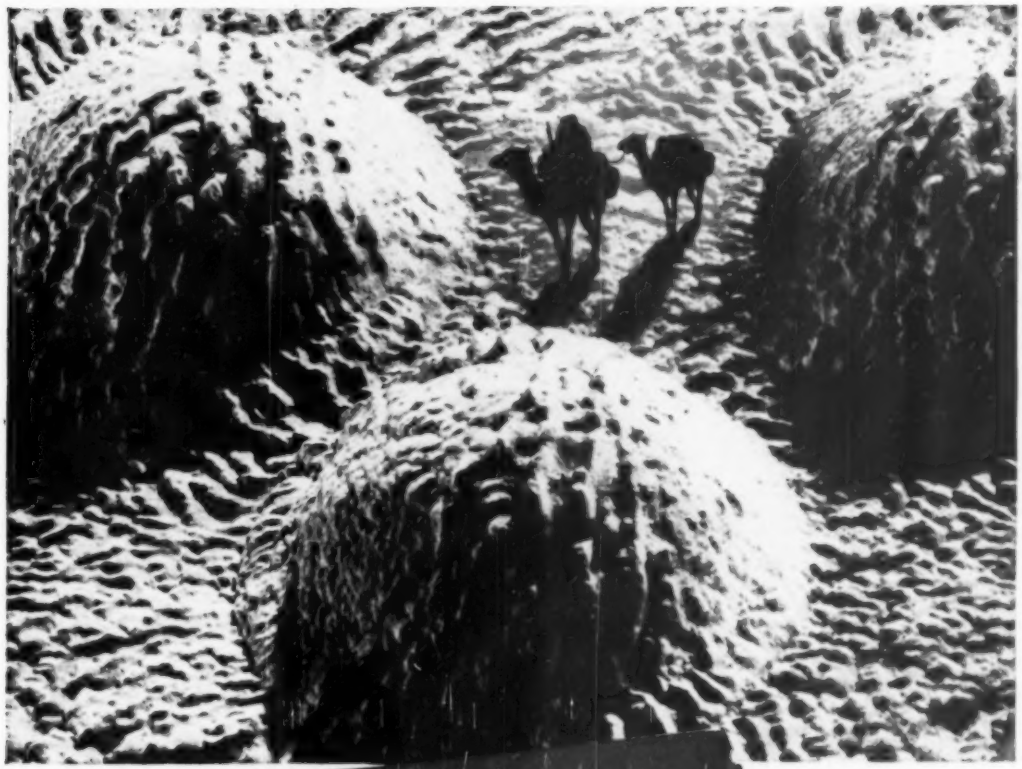
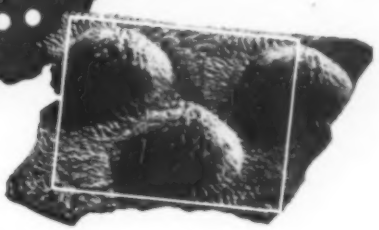


Desert Waste...



THIS "desert" was formed under water—improperly treated boiler water. It represents needless waste in several ways... Boiler down time... Overheated drum and rivet metal... Loss of heat transfer efficiency... Sluggish response to load changes.

Since the scale was removed, The Nalco System has kept the boiler clean-to-metal and corrosion-free continuously—and economically. Where conditions require uninterrupted boiler operation, The Nalco System can also be utilized to remove old scale, as well as prevent new deposits. Either way, The Nalco System is your assurance of *permanent water treatment results.* Write for prompt action on your problems.

Rectangle in small photo shows area of scale sample in large illustration. "Hills" are scale-covered rivet heads. Approximate size of sample: 7" x 5". *Nalco Laboratory photo.*

NATIONAL ALUMINATE CORPORATION
6226 West 66th Place
Chicago 38, Illinois

Canadian inquiries should be addressed to Alchem Limited, Burlington, Ontario

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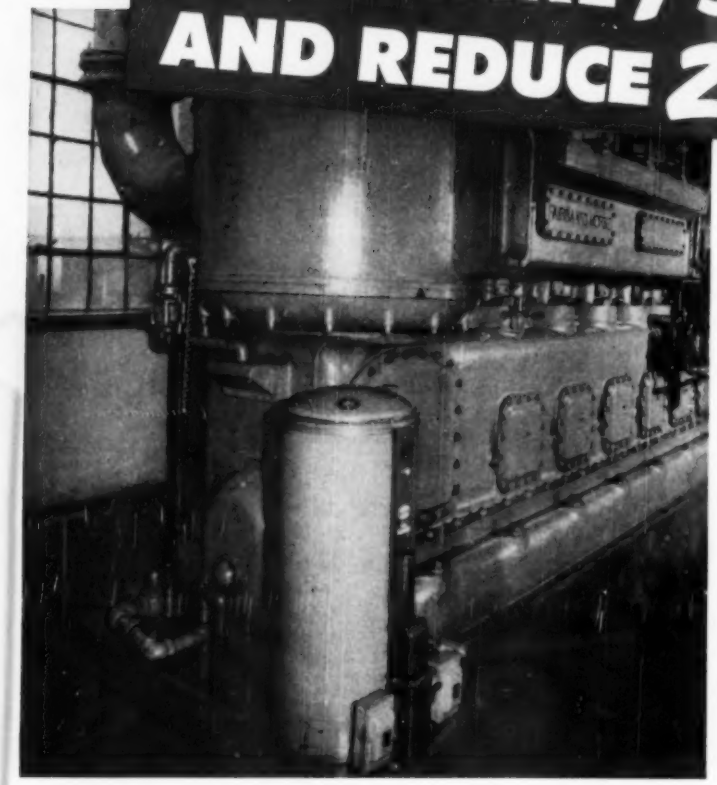

Down go fuel consumption and upkeep expense when you lubricate your Diesels with TEXACO URSA OILS

Take that cost-saving step today. Lubricate your Diesels with *Texaco Ursa Oils* and note how much less fuel you use. Note, at the next scheduled overhaul, how clean your engines are, how free of harmful carbon and sludge deposits. *Texaco Ursa Oils* keep your engines really clean.

Made especially for Diesel lubrication, *Texaco Ursa Oils* have outstanding resistance to oxidation. Their tough, protective lubricating films hold up under the severest operating conditions. Parts last longer. Engines run better, maintenance costs come down.

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More stationary Diesel h.p. in the U. S. is lubricated with Texaco Ursa Oils than with any other brand.

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SOUTHERN POWER AND INDUSTRY

NOVEMBER 1950

Published monthly at 115 E. Gordon
Dalton, Ga.
by W. R. C. SMITH PUB. CO.

Publishers also of: *Textile Industries, Electrical South, Southern Hardware, Southern Automotive Journal, Southern Building Supplies.*

CONTENTS

PRACTICAL DISCUSSION

DEPARTMENTS

Contents indexed regularly by Engineering Index, Inc.

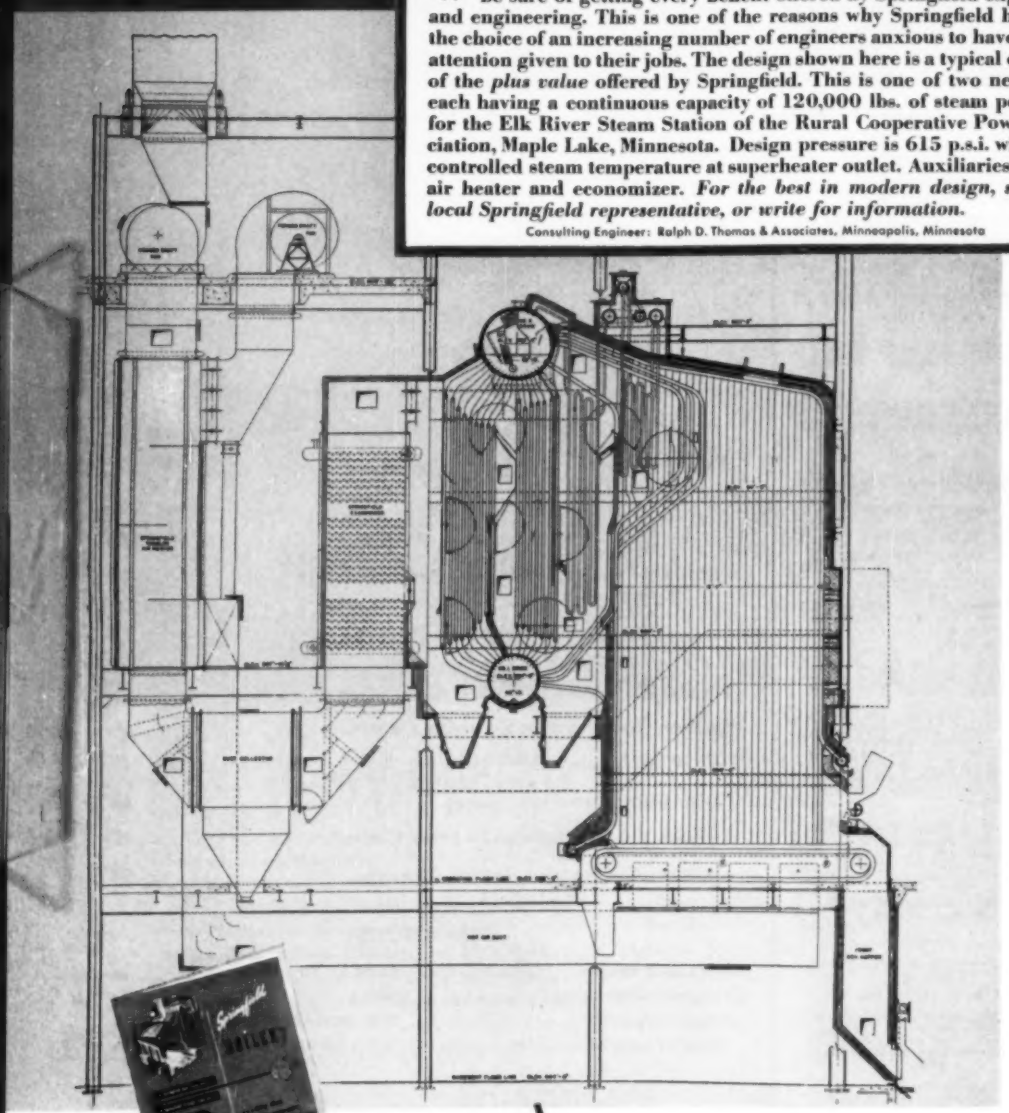
Editorial and Executive Offices: **SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E., ATLANTA 5, GEORGIA**

Engineered

EFFICIENT! ACCESSIBLE! COMPACT!

WHEN your steam generating unit is built by Springfield, you can be sure of getting every benefit offered by Springfield experience and engineering. This is one of the reasons why Springfield has been the choice of an increasing number of engineers anxious to have careful attention given to their jobs. The design shown here is a typical example of the *plus value* offered by Springfield. This is one of two new units, each having a continuous capacity of 120,000 lbs. of steam per hour, for the Elk River Steam Station of the Rural Cooperative Power Association, Maple Lake, Minnesota. Design pressure is 615 p.s.i. with 830° controlled steam temperature at superheater outlet. Auxiliaries include air heater and economizer. *For the best in modern design, see your local Springfield representative, or write for information.*

Consulting Engineer: Ralph D. Thomas & Associates, Minneapolis, Minnesota



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CHECK WITH YOUR CONSULTING ENGINEER ON MODERNIZATION AND NEW PLANT PROJECTS

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

November, 1950

FIRE PROTECTION FOR GENERATING STATIONS, a special feature report in December SP&I, will discuss modern methods for controlling specific fire hazards. Authored by Adolf H. Merganthaler, principal electrical design engineer for Southern Services, Inc., Birmingham, extensive report will establish a guide to help put sound fire protective measures into practice.

Specific coverage includes advantages and disadvantages of carbon dioxide, carbon tetrachloride, foam, dry powder, fog, and water. Recommended protection for generators, transformers, switchgear, turbines, motors, roofs, etc. is presented.

NEW SUPER REFRACTORY "ALLMUL" for lining high-temperature furnaces is now being produced in quantity from a base of mullite at the B & W Refractories Division plant in Augusta, Georgia. Allmul will not melt until it is heated to more than 3300 F, nearly one-third higher than the melting point of steel. Its cold crushing strength is 1.7 tons/sq in., and under temperature, it shows practically no deformation when saturated with heat at 3000 F and loaded for 1½ hours at 25 psi.

CHAIN HOIST DESIGN of Yale & Towne, utilizing high strength aluminum castings and alloy steels, offers units weighing only one-half as much as conventional hoists of same capacity. One ½ ton capacity model weighing only 36 lb, will raise a full load three feet in 20 seconds.

FINISHES FOR ALUMINUM are many and diverse. Reynolds Metals Company's 1950 edition of their process manual on the subject includes information on 10 cleaning treatments, 15 mechanical finishes, 16 chemically produced finishes, 11 electrolytic oxide finishes, organic finishes, and specialized finishes such as luminous paints and vitreous enamels.

UNBREAKABLE BUCKET FOR CORROSIVE CHEMICALS, developed by U. S. Rubber, is made of Enrup, a tough new thermosetting blend of plastic and rubber. Will resist aliphatic solvents, all concentrations and types of alkalies, most acids up to temperatures of 150 F. Not designed for carrying formic, glacial acetic or concentrated nitric and sulphuric, however, nitric and sulphuric in concentrations up to 50 per cent can be handled. Not recommended for aromatic solvents, esters or ketones.

NEW SLIDE-SET VISE, opening and closing to any position in one second through a push-pull action, eliminates spinning the handle. The 4-in. capacity, 58 lb Dodge Manufacturing Corporation unit has a fast positive slide action. Turn and a half of the handle counter-clockwise and the jaw slides in "neutral" to any position. When work is engaged, vise operates in the conventional manner.

IN THE RECENT PLANNING OF AN ULTRA MODERN POWER PLANT, 75 specialists were called upon to furnish more than 100 units or major classes of equipment. The list included 15 units for coal handling and preparation, 11 items of feedwater equipment, the steam generating set-up, the turbine-generator layout, valves and piping, electrical equipment and some 30 miscellaneous items ranging from soot-blower air compressor to cooling water pumps, and from combustion air heaters to an instrument air dehydrator.

These highly specialized components of big power plants as well as the hundreds of smaller units for individual power or process steam supply for small industrial and power plants are within the scope of the 19TH NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING to be held in the Grand Central Palace, New York, November 27 - December 2, under the auspices of the A.S.M.E.

ALCOA'S POINT COMFORT, TEXAS reduction works (See July SP&I for complete technical description) utilizes about 3500 ft of SEAMLESS ALUMINUM CABLE SHEATHING in the telephone system. Aluminum sheathing for cable is thinner, stronger and lighter in weight than the usual lead. Application method involved the principle of cold reduction, or swaging (as by a tube reducer).

NEWLY AUTHORIZED GAS PIPELINE CONSTRUCTION will materially strengthen the South's industrial position. Already authorized are natural gas lines to Charlottesville, Richmond, Petersburg, Suffolk, Portsmouth, Norfolk and Newport News, Va. Other key cities scheduled to receive natural gas shortly are Baltimore, Chattanooga, Knoxville and Nashville. Pending before the Federal Power Commission are proposals to extend lines to cities in South Carolina, North Carolina, Louisiana, Georgia and Florida.

DIRECTORY OF RESEARCH SERVICES AND FACILITIES, giving fields of specialization, key personnel, contract policies and capacity of research organizations in 14 Southern states, will be published in early '51 by the SOUTHERN ASSOCIATION OF SCIENCE AND INDUSTRY, INC., 5009 Peachtree Rd., Atlanta, Ga. Directory designed to help plant executives solve problems in chemistry, ceramics, metallurgy, electronics, etc.

HYDRO-LIFT DRIVE -- a gasoline engine driving a hydraulic pump and motor -- has been applied to the new Clark Equipment Company 6,000 lb capacity hand truck. Hydraulic motor is mounted in the 14-in. drive wheel, with output shaft driving through a reduction to an internal gear in the wheel. Gas engine drives a hydraulic pump of eccentric vane type with variable displacement from 0 to 15 gpm. Pump in turn drives a constant displacement hydraulic motor of vane type with a sequence valve. Hydraulic pressure keeps vanes in contact with the case at low speeds. It is claimed that the motor develops 90 per cent of full torque below 10 rpm.

BY ELIMINATING CONDENSER CLEANING DOWN-TIME, approximately one month of full capacity operation has been added to the service of one of the four 60,000 kw turbo-generators in the 240,000 kw Plant Atkinson of the Georgia Power Company. Operating engineers used to spend from 2 to 3 hours every day removing ½ to 2 yards of debris from condenser tubes and tube sheets. Turbine load was cut in half while operating against excessive back pressure. Since installation of a Wheeler "Self-Cleaning" Condenser in 1949, there hasn't been a single shut-down for cleaning, with the mechanism handling 70,000 gpm of river water. Full operating details of the self-cleaning condenser will be reported in December SP&I by R. S. Causey, Superintendent of Plant Atkinson.

SOUTHERN RESEARCH PROJECTS as reported by Southern Association of Science and Industry's JOURNAL OF SOUTHERN RESEARCH:

An ALARM SYSTEM FOR CONDENSATE RETURN LINE in citrus processing plants has been developed by the University of Florida permitting the safe re-cycling of condensate from steam units such as fruit scalers, section cookers, etc. System checks the electrolytic conductivity of the condensate. Experience at one Florida plant indicates that system costing $500 would save $2500 per season in a plant using 500 boiler horsepower.

Working on the development of a satisfactory COAL-FIRED GAS TURBINE, the Southern Research Institute in Birmingham is engineering an air-balance device for measuring feed rate from the pressurized coal tank.

Delta Tank Manufacturing Company at Baton Rouge, La., has developed a siphon-like automatic agitating device which keeps BUTANE AND PROPANE FROM SEPARATING in a storage tank, thus prolonging the burning life of the mixture.

Tennessee Eastman Company, Kingsport, Tennessee has produced TRANSPARENT TENITE PIPE, in 4-in. diameter continuously extruded form for use in conveying corrosive materials. Transparent feature enables users to locate flow stoppages and direct cleaning efforts.

Write the editors for additional information on any of the above items.

SOUTHERN POWER & INDUSTRY 806 Peachtree St., N.E. Atlanta 5, Ga.

---

low-cost process heat

dependable low-speed power

GET BOTH with G-E

If your plant uses process steam, you may be able to improve over-all heat balance by driving low-speed equipment with General Electric geared turbines. Mechanical drive turbines act as reducing valves to drop boiler steam pressures down to utilization temperatures for process requirements. With turbines skimming off only a small portion of the steam's heat, mechanical power for driving fans, blowers, pumps and other low-speed apparatus is almost free.

Standard Type DP and DR turbines, combined with General Electric precision-type gears, are ideal for many such applications.

PRECISION GEARING

General Electric balanced-thrust gears are specifically designed for use with turbine drives. Smoothness and quietness of operation are the result of maintaining tooth contours and spacing to a high degree of accuracy.

Positive lubrication assures long life. Oil is delivered to the bearings from a gear-type pump driven by the pinion shaft. The gear mesh is spray-lubricated.

To meet a variety of application requirements, these gears are available in ratios from 1.5 to 10.3.

PRECISION GOVERNING

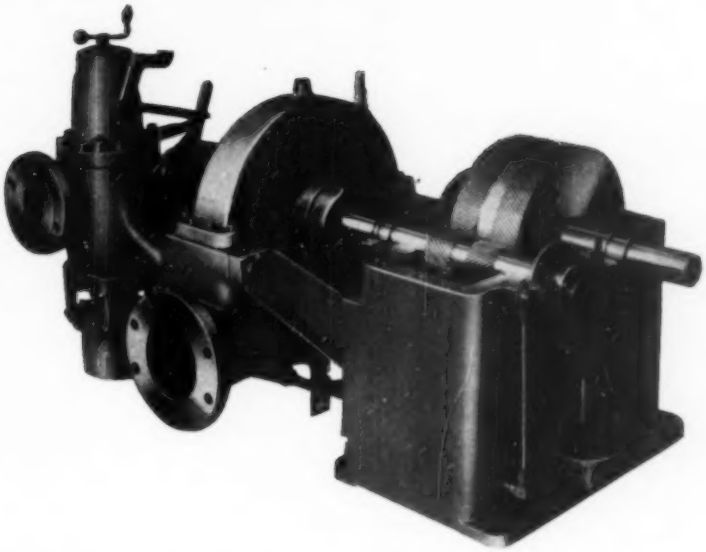
General Electric Type DP and DR turbines include extra features at no extra cost. The DP's hydraulic governing system provides a speed range of 30 per cent with 6 per cent regulation. The DR's oil-relayed governor offers speed ranges up to 5 to 1 with accuracy of ¼ of 1 per cent. Each turbine has its easily operated trip-throttle valve and governing valve combined in one compact unit. Rugged construction from quality materials makes these standard turbines outstanding for reliability and efficiency.

ONE INTEGRAL UNIT

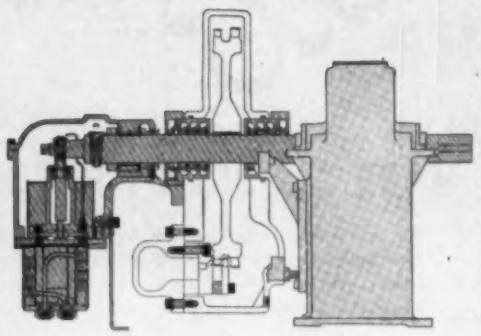
General Electric close-coupled turbine-gear sets have one common turbine and pinion shaft, with the turbine and gear casings solidly connected by a sturdy fabricated bracket. This construction results in a compact unit, does not require high-speed coupling.

Many standard parts are interchangeable with other turbine and turbine-gear drives.

Your nearby General Electric sales office will supply you with full details about mechanical-drive turbine-gear sets. Or, if you prefer, write for free copies of illustrated bulletins on these drives. The DP and DR turbines are described in bulletins GEA-4955 and GEA-5193. Bulletin GEA-5152 contains information about gears. Learn how installing these precision drives in your plant can save you money. Apparatus Department, General Electric Company, Schenectady 5, N. Y.



TURBINE-GEAR DRIVES



HERE'S WHAT STANDARDIZATION PROVIDES FOR YOU

This diagram shows how a standard DP turbine is close-coupled to a low-speed gear using an integral turbine and pinion shaft. All shaded turbine parts are interchangeable on all sizes of DP turbines. Thus, it is easy to stock spares, and maintenance costs are reduced. All individual turbine models and gear sets have standard shaft heights for easy installation or re-location in your plant. In addition, standardization cuts manufacturing expense, and the savings are passed on to you in the form of extra features usually found only on "special" turbine-gear drives.

GENERAL ELECTRIC

252-47

TOUGH LAYOUTS

- ✔ Assured Safety
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The high degree of skill acquired by Navco Engineers from long experience in solving unusual Piping problems is your guarantee of an accurate and workmanlike Piping System.

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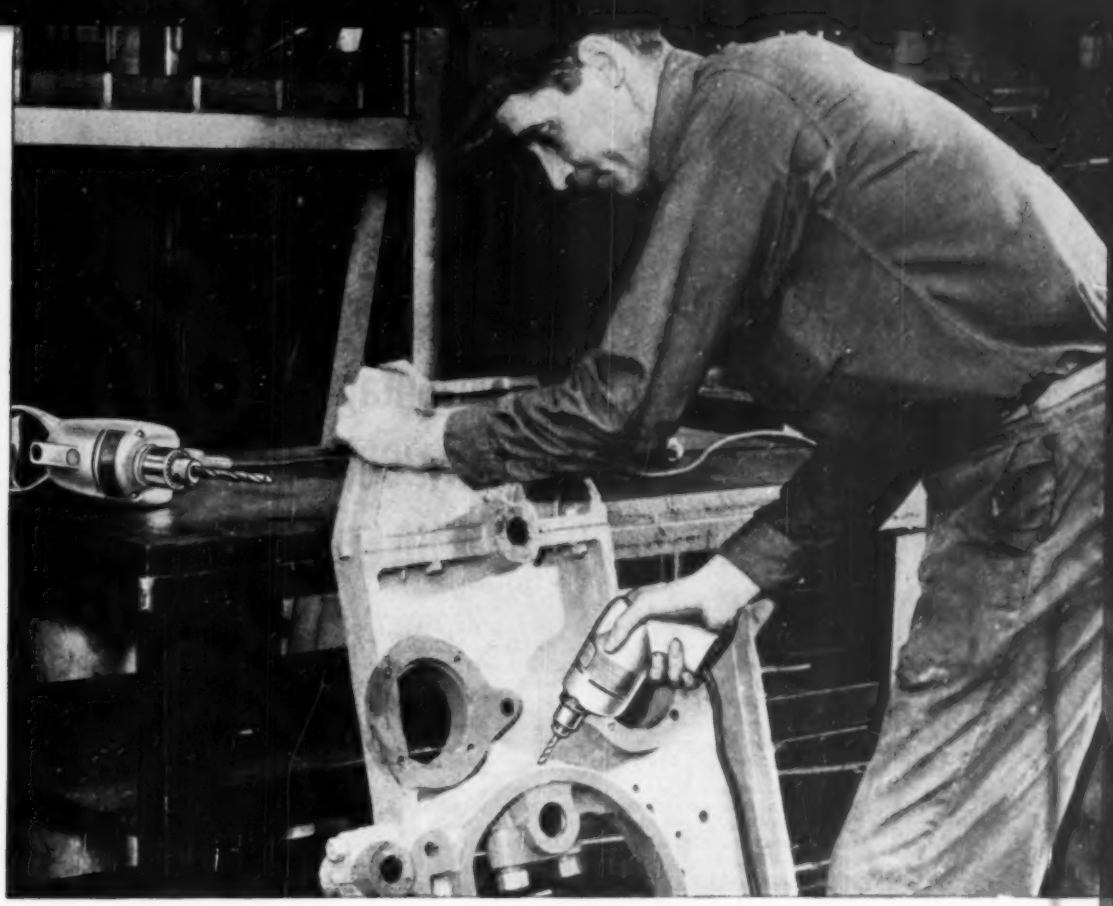
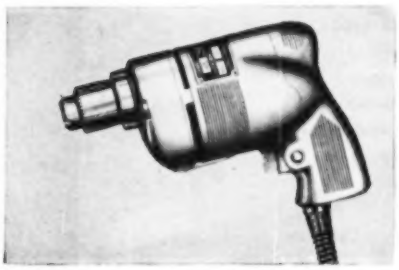


Difficult angle drilling on end castings for GASMACO's Automatic Time Cycle Control is made easy with a Model 45 SKIL Drill. (Model 80—½ inch Drill on bench.)

SKIL DRILLS

at GASMACO* do difficult angle jobs better . . . faster



MODEL 45 SKIL DRILL

Powerful, compact ¼ inch Drill. Easy to handle—only 6⅝ inches long, weighs only 2½ lbs. Ask your SKIL Distributor to show you this Model 45 SKIL Drill.

Where shop efficiency requires the tool to come to the work, GASMACO does production jobs with portable SKIL Drills. In GASMACO's Cleveland plant, production workers prefer SKIL Drills for their light weight, easy handling; for their fast action in tough, heavy materials. In industrial plants everywhere, SKIL Drills stand up longer, need fewer repairs. It will pay you to standardize on SKIL Drills. Ask your SKIL Distributor about them today.

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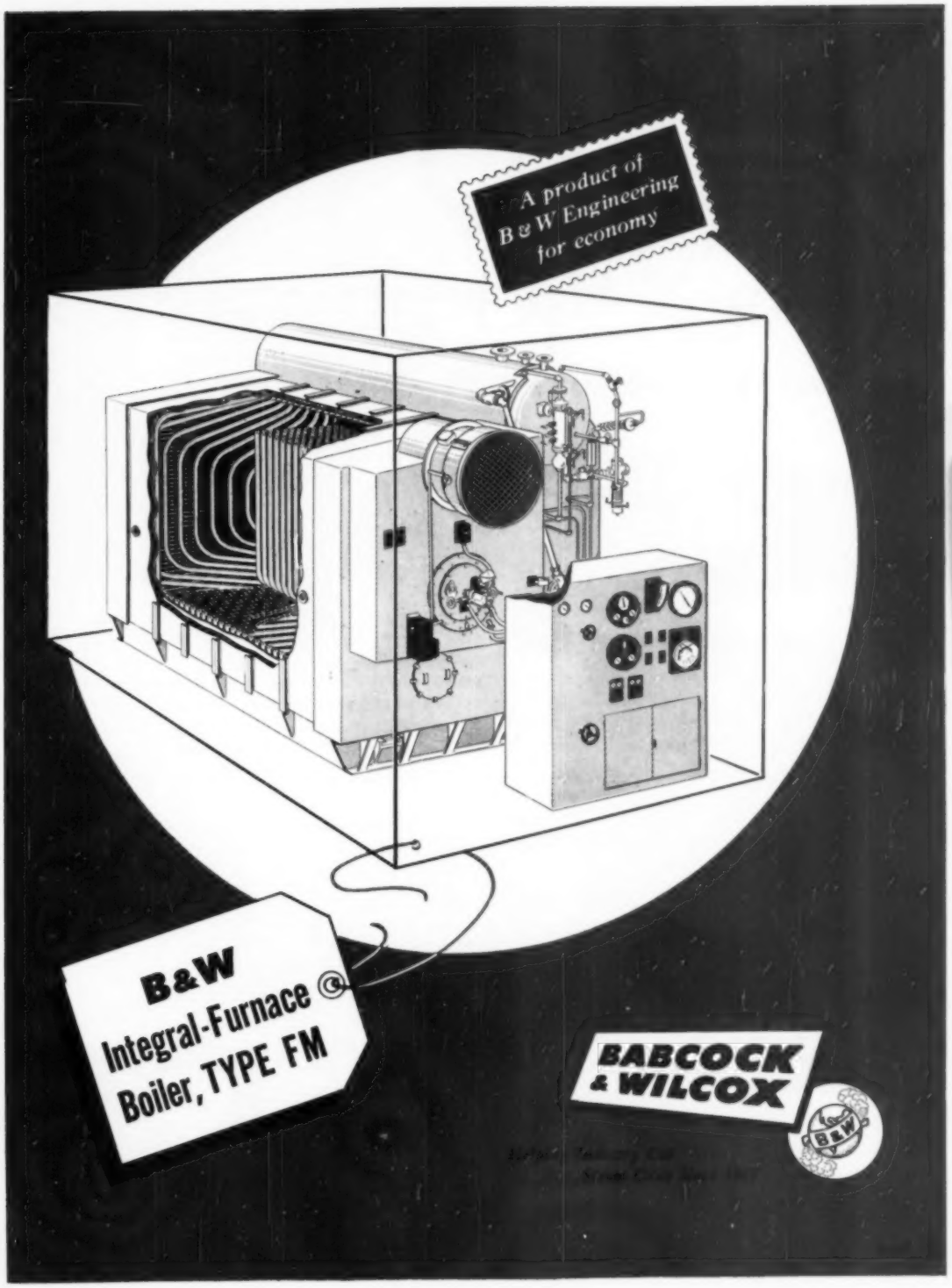
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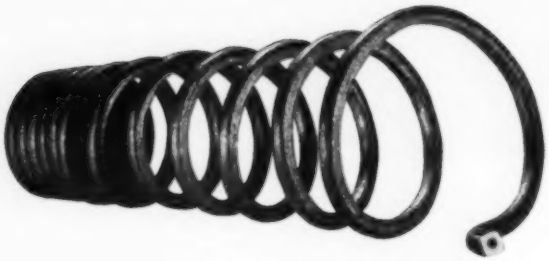
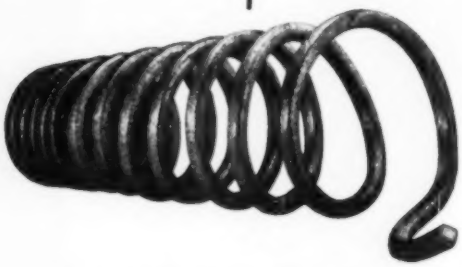


R/M No. 121
R/M No. 122
2 high-pressure packings especially built for tough jobs



Raybestos-Manhattan manufactures a variety of packings especially designed for compressors, steam pumps, steam valves, expansion joints and other high-pressure equipment.

R/M No. 121 is constructed of asbestos cloth over a resilient core of asbestos and rubber. It is commonly used on steam engines, compressors and pumps. It is also available in a solid form (No. 124).

R/M No. 122 is made of a resilient rubber core covered with bias-cut asbestos cloth lubricated and graphited. It is recommended for reciprocating steam or air rods and valve stems. For extra-heavy service, this packing can be furnished reinforced with wire-inserted cloth.

For full information on R/M packings for high pressure equipment, see the authorized R/M packing distributor near you, or send in the coupon below.

RAYBESTOS-MANHATTAN, INC.

PACKING DIVISION, MANHEIM, PA.

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R M

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THE Armstrong hardened chrome steel valve opens wide and closes tight — with a snap! This eliminates throttling and consequent wire drawing. The Armstrong free-floating lever mechanism is almost frictionless. The bucket and valve lever assembly are 18-8 corrosion resistant stainless steel. The mechanisms of Armstrong steam traps for low and medium pressures are identical in materials and workmanship to those used in Armstrong traps for pressures to 1500 psi, 900 F.

There is nothing in an Armstrong trap to bind, stick, collapse or leak. *Now is the time to quit working for your steam traps and buy the traps that will work for you.* Call your nearby Armstrong representative today.

ARMSTRONG MACHINE WORKS
806 Maple St., Three Rivers, Mich.

50% SAVINGS IN MAINTENANCE since installing Armstrong steam traps on the heating system at *John Deere Ottumwa Works, Ottumwa, Iowa.* This is typical of reports from Armstrong users.

THE 36-PAGE ARMSTRONG STEAM TRAP BOOK contains complete data on the design, operation, selection and installation of Armstrong steam traps for all services. Send for your free copy.

ARMSTRONG STEAM TRAPS

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143 **CENTRIFUGAL PUMPS** — Bulletin B-165 — Fluidyne small centrifugal pumps for general service, compact construction, flexible, economical and durable. 1 to 20 hp, 20 to 1000 gpm, 20 to 270 ft head. —PEERLESS PUMP DIVISION, FOOD MACHINERY CORP.

161 **CENTRIFUGAL PUMPS** — Bulletin 244—Illustrates and describes Warren Type TH, 6 stage, high pressure pumps for boiler feed, pipe line, mine drainage and other high pressure requirements up to 1200 psi.—WARREN STEAM PUMP CO.

184 **UNIT HEATERS** — Catalog 12-C-1 — Gives complete working data on down-blow unit heaters, particularly intended for high installations ranging 15 to 45 ft above working zone, and other spot locations as described.—FEDDERS-QUIGAN CORP.

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207 **PRESSURE REDUCING VALVES**—Catalog 73—Gives complete information on Mason No. 11 reducing valves to provide accurate, dependable pressure control under all normal conditions.—MASON-NEILAN REGULATOR CO.

210 **TOTALIZING-INDICATING FLOW METERS** — Bulletin 46-766 — Describes the application of the new Hays Veriflow totalizing-indicating meter, with remote indication of rate of flow for practically all liquids.—THE HAYS CORP.

215 **TEMPERATURE REGULATOR** — Catalog 550—Describes Sarco temperature regulator to keep heating coils and heaters at correct temperature—inexpensive. —SARCO CO., INC.

238 **SWITCH CONTROLS** — Catalog No. 600-A — Gives complete information regarding a broad line of dependable controls for various industrial requirements as well as suggested applications.—THE MERCOID CORP.

244 **CO_2 RECORDER** — Publication 47-550—Describes the automatic Hays CO_2 recorder, or combustion meter, permanently mounted and automatic, to give readings every two minutes throughout the 24 hours.—THE HAYS CORP.

250 **DIAL THERMOMETERS** — Bulletin 355—Describes dial thermometers intended to give accurate temperature readings and improved efficiency in process—vapor pressure actuated, with flexible tubing or rigid stem connections.—THE POWERS REGULATOR CO.

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391	407	420	445	447	454	461	469	483	488	492	494	496	506	510	515	517
529	538	551	582	588	606	620	634	636	661	688	724	738	742	788	796	806
818	831	845	856	858	870	1006	1007	1029	1031	1035	1040	1045	810	813	812	813
814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	

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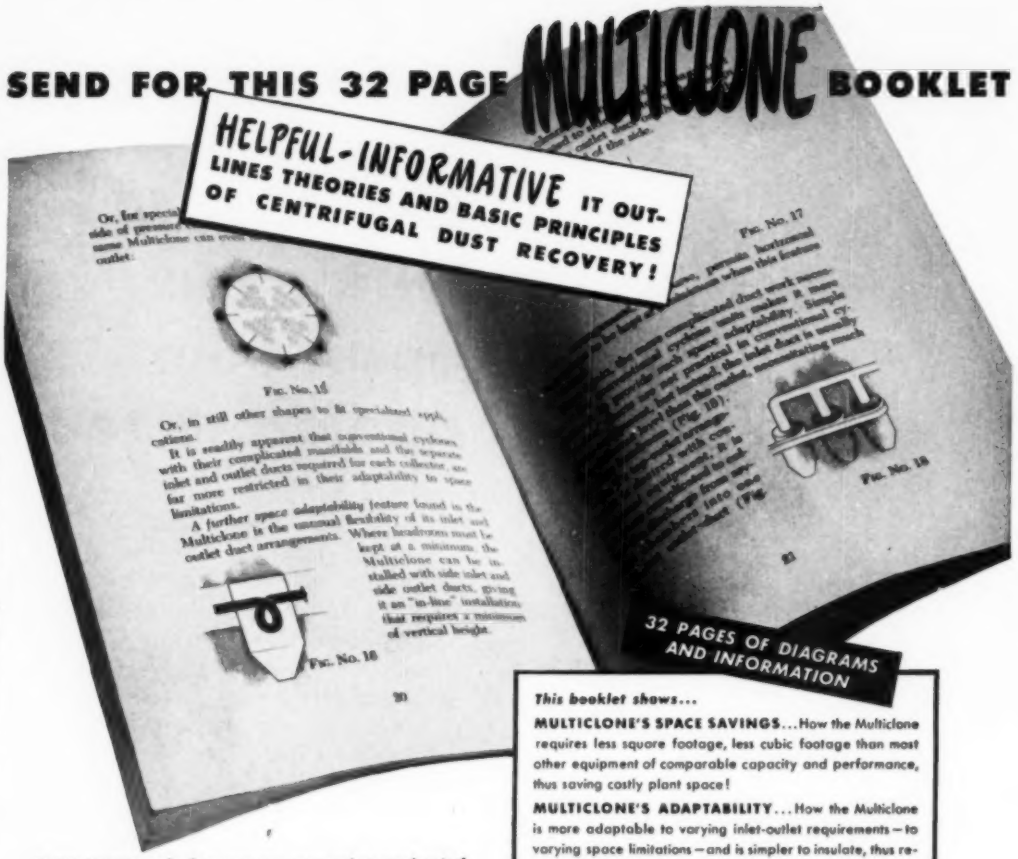

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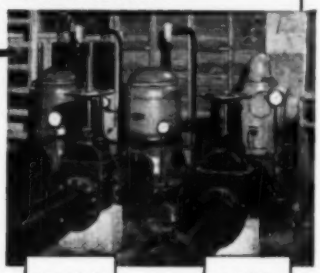

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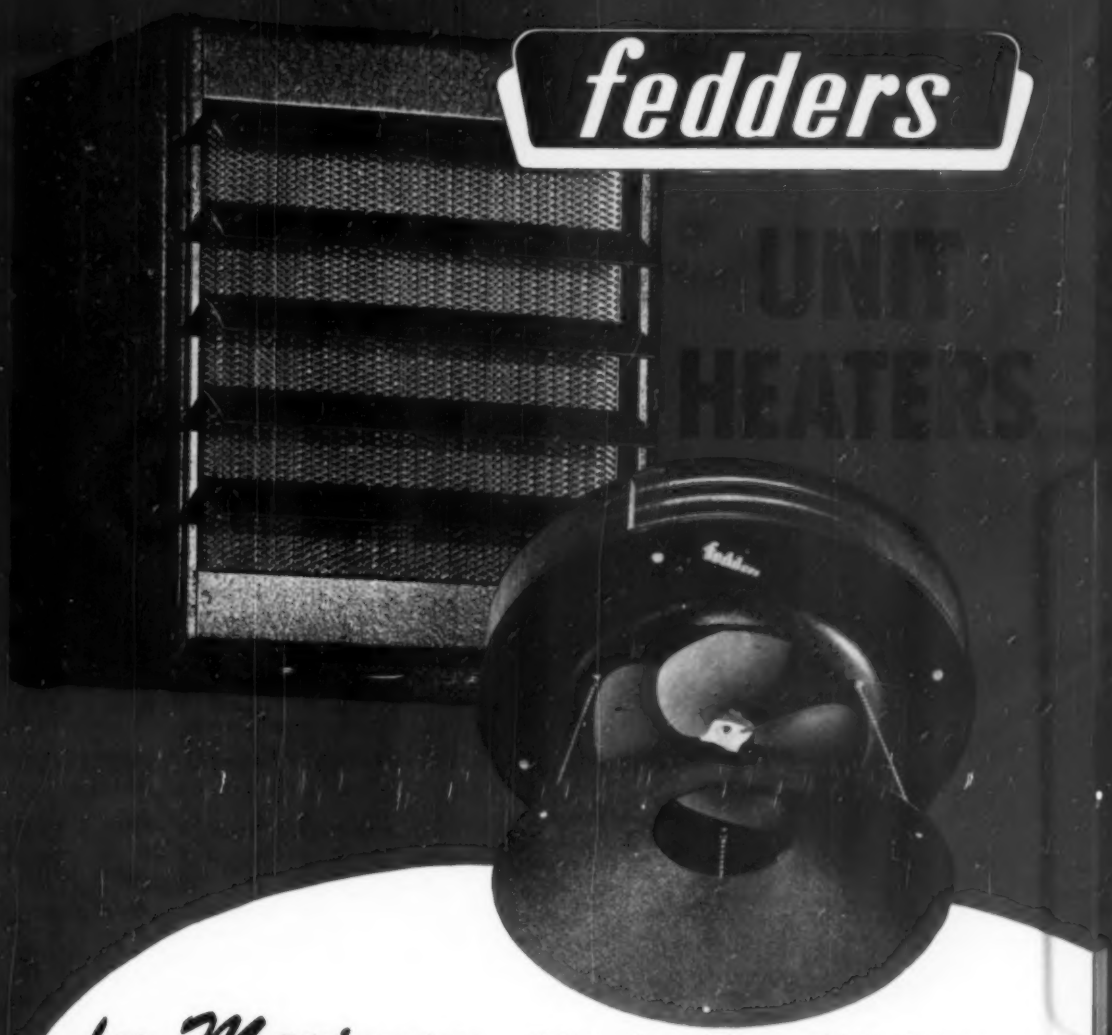


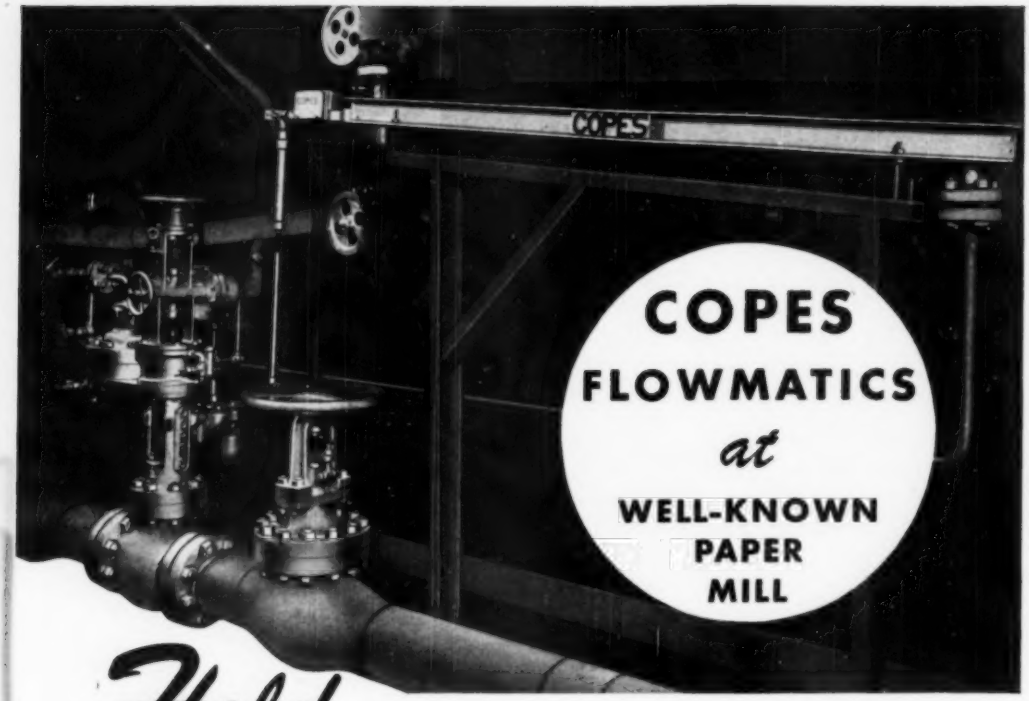
for Maximum Output with Minimum Cost

Fedders advanced design and high efficiency provide the most economical heating unit from every standpoint of easy installation, quick response to manual or thermostatic control and fuel savings. Made in a complete range of well-graduated sizes in horizontal and downblow types.

Write for name of your local representative.

FEDDERS-QUIGAN CORPORATION

BUFFALO 7, N. Y.



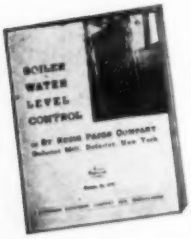
Hold CLOSE WATER LEVEL on fast-steaming boilers taking rapid swings

Here is one of two COPES Flowmatics serving 810-psi, 825-F C-E Type VU boilers in one of New York State's most modern paper mills. Rated at 110,000 pounds per hour, each boiler is subject to a sharp load change every three minutes. Despite this severe service, drum water level is held within plus-or-minus one inch.

NORTHERN EQUIPMENT COMPANY

1103 Grove Drive, Erie, Pennsylvania

BRANCH PLANTS in Canada, England, France, Austria, Italy • *Representatives Everywhere*



The story of this important installation is told in Performance Report Bulletin 479. Write—on your letterhead, please—for your copy.

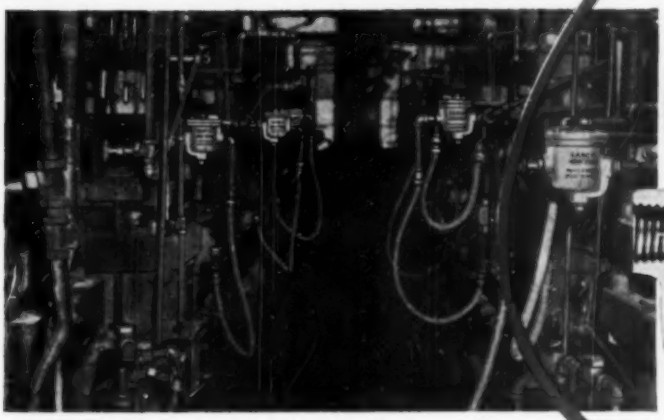
COPES

Headquarters for . . .

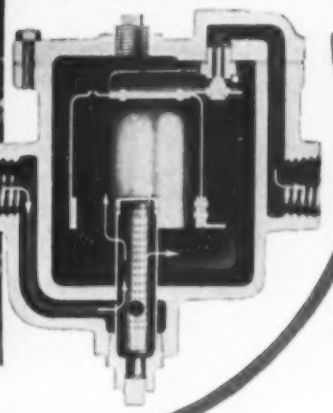
Boiler Feed Water Control . . . Excess or Constant Pressure Control, Steam or Water . . . Liquid Level Control . . . Balanced Valves . . . Desuperheaters . . . Boiler Steam Temperature Control . . . Hi-Low Water Alarms.

five million

TRAP DAYS *of Satisfactory Operation with*

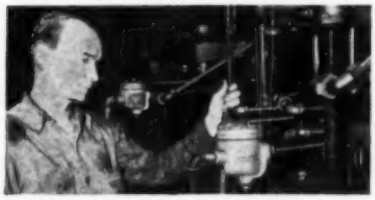


A few of the 100 Sarco Bucket Traps in this Plastics Plant



Here's a "test" to end all tests as far as steam traps go. More than 100 Sarco Bucket Traps in operation 24 hours a day most of the time for more than 15 years! As the manager of this plastics plant puts it "They are tops in satisfaction—what more can I say." And the mechanic who put them in and has had charge of the steam service for 22 years, says "Sarco ended our trapping problems 15 years ago."

IT COSTS LESS TO BE RIGHT — The invariable result of adding Sarco Steam Traps and Temperature Controls to improve production is a *saving in fuel costs.* Heat where you want it, when you want it — never too much — or too little or too late. To be right the first time see Sarco first.



SARCO BUCKET STEAM TRAPS

SARCO Bucket Steam Trap clears condensate instantly. And it costs less to install because of the built-in strainer (at no extra cost) and the straight-thru connection which saves piping materials, time and labor. Ask for Catalog No. 350.

310

SARCO SAVES STEAM

SARCO COMPANY, INC.

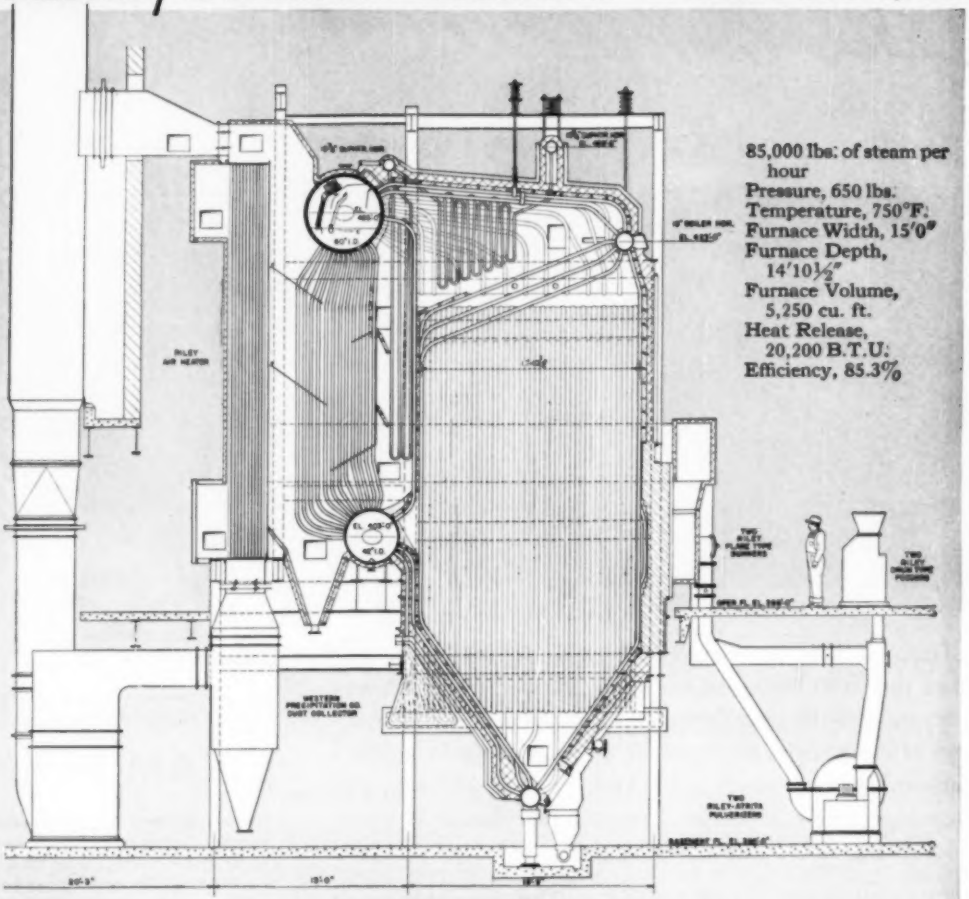
Represented in Principal Cities

Empire State Building, New York 1, N. Y.

SARCO CANADA, LTD., TORONTO 5, ONTARIO

IMPROVES PRODUCT QUALITY AND OUTPUT

Brantly Steam Station - Danville, Va.



85,000 lbs./hr. Riley Steam Generating Unit—550 lbs. 750°F.

BRANTLY STEAM STATION
CITY OF DANVILLE, VA.

Chas. T. Main, Inc., *Consulting Engineers*

Built under the Auspices of
MAYOR EVERETT E. CARTER M. R. D. BROWN, *Pres. City Council*
E. M. HAWKINS, JR., *Mgr. of Utilities* B. G. ADKINS, *Supt. Elec. Dept.*

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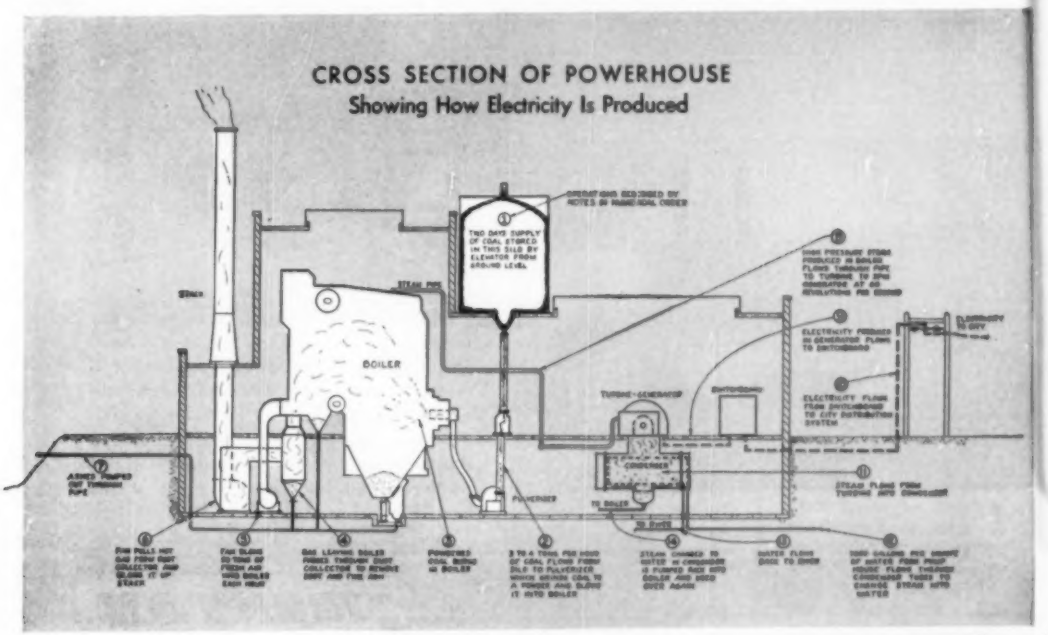
BOILERS • PULVERIZERS • BURNERS • STOKERS • SUPERHEATERS • FLUE GAS SCRUBBERS

A Fine Example of Good Engineering

The new Brantly Steam Station of the City of Danville, Va., recently placed into operation, is a modern, efficient, well-engineered 7,500 K. W. plant, designed to be expanded ultimately to three units. The Riley pulverized coal fired 85,000 lbs./hr. steam generating unit and the generator are located in the same room with the control panel between them as illustrated below.

Like at so many of the more efficient plants today, whether large or small, steam is reliably and economically generated with a Riley Steam Generating Unit, in this case pulverized coal fired by Riley pulverizers and burners. The single header water-cooled hopper bottom Riley unit was selected because it assured efficient trouble-free operation and because its unique hopper design not only reduced the required building height and cost, but eliminated the cost of a separate ash hopper.

While the initial investment savings resulting from the installation of the Riley single header hopper bottom unit are obvious, you have to see this unit in operation to fully appreciate its performance and construction characteristics. Why not visit a Riley installation when you are considering the installation of steam generating equipment. You will then know why so many engineers select Riley as their first choice.



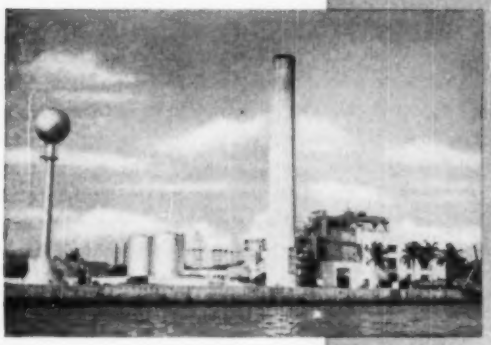
A survey of your Power Plant by a consulting engineer will possibly show ways of making surprisingly large ... costs

COMPLETE STEAM GENERATING UNITS

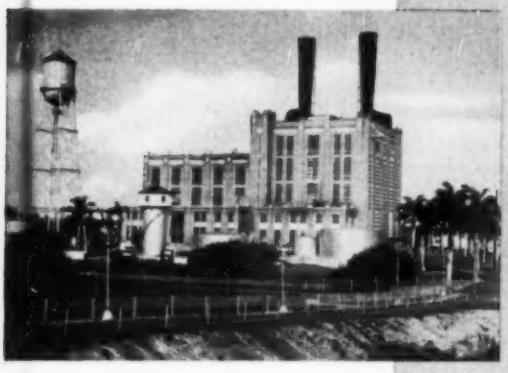
ECONOMIZERS WATER-COOLED FURNACES • STEEL-CLAD ... • AIR HEATERS

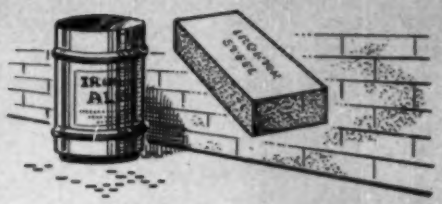
. . . it will pay you to visit modern Riley Installations before purchasing Boiler or Fuel Burning Equipment

MORE ELECTRIC POWER FOR THE HOMES AND INDUSTRIES OF THE SOUTH . . . AND LESS REFRACTORY MAINTENANCE WITH "IRONTON STEEL" FIRE BRICK



. . . that's the promising outlook for these new Southern generating plants. The boiler and furnace brick work . . . *in areas where severe conditions are expected and where failures of the refractories would cause expensive shut-downs* . . . has been constructed with "Ironton Steel" Fire Brick. Kentucky clays of unusually high refractory value, subjected to high vacuum when formed in power presses, produce a brick that is dense, uniform, structurally strong and resistant to erosion and spalling.





"IRONTON ALSET" is the perfect bonding mortar for "Ironton Steel" brick. This air-setting high temperature cement is made to form a joint actually stronger and more refractory than the brickwork. It seals against gas and air. It works easily as mortar, dip, or spray. Ironton representatives in the South can tell you more. Call the nearest one listed below.

ASK FOR INFORMATION ON:
"Ironton Mulcrete" — Castable Refractory
"Ironton Nojoint" — Plastic Refractory
"Ironton Refcoat" — Coating Material
"Ironton Baffle Cast" — Castable for Boiler Baffles
"Ironton" Special Shapes

RELIABLE REFRACTORIES

THE IRONTON FIRE BRICK COMPANY
IRONTON, OHIO

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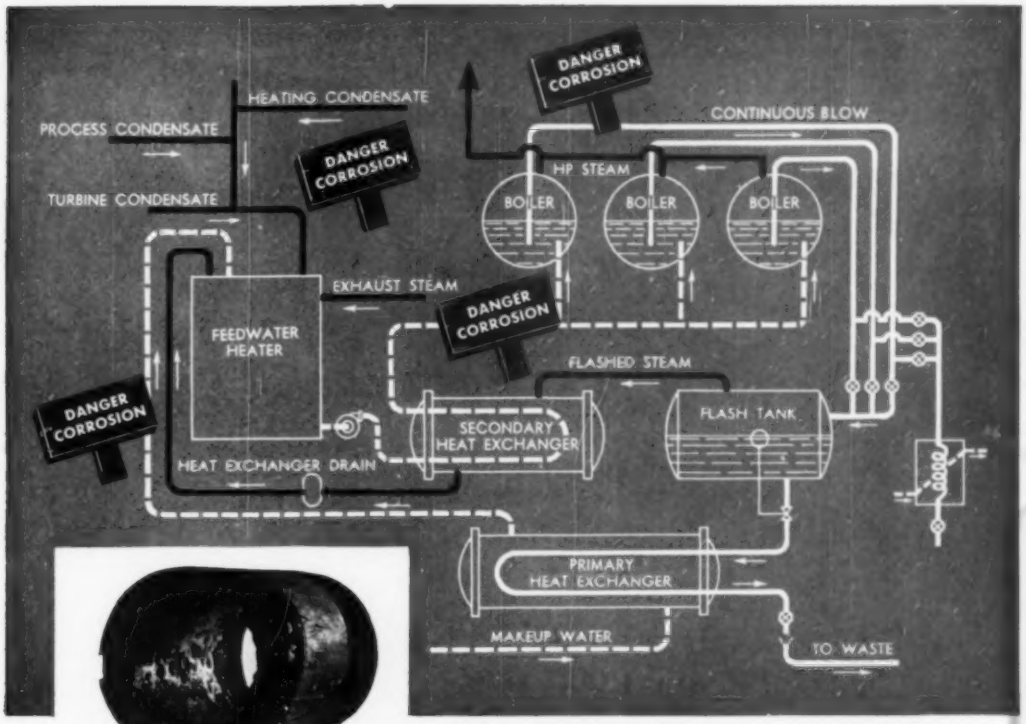
Washington, D. C.	TAylor 0014



AVOID These Danger Signs with BIRD-ARCHER Amine Treatment

CORRODED condensate return lines lead to expensive pipe replacement and maintenance. As an added annoyance, the solid products of corrosion often plug return lines and fill traps. You can steer clear of these troubles by using the *effective, economical* Bird-Archer Amine Treatment.

HERE'S THE WAY THIS B-A TREATMENT WORKS

Amines are fed into the boiler or into the steam and condensate systems. The amines raise the pH value of the condensate and also tend to inhibit equipment-destroying corrosion through surface protection of the metal itself.

HERE'S HOW THIS B-A TREATMENT SAVES MONEY

Raising the pH value of the condensate severely decreases maintenance costs by eliminating corrosion. These savings may more than offset the amount of treatment required to provide protection for your equipment.

NEW BULLETIN gives full details on the Bird-Archer Amine Treatment. . . . contains case histories that prove its successful application in many plants. *Write for your copy today.*

BA-134

WHAT AMINES ARE

Amines are members of a class of chemical compounds in which one or more hydrogen atoms of the ammonia molecule are substituted by an organic group. Some of the simpler types are soluble and volatilize from boiler waters. The alkalinity of the amines is an inherent property and does not result from decomposition. *No free ammonia is released.* In the concentrations necessary for protection of condensate systems, amines are harmless to non-ferrous metals, non-toxic and are completely stable at temperatures approximating 675F.

BIRD·ARCHER
WATER TREATMENT

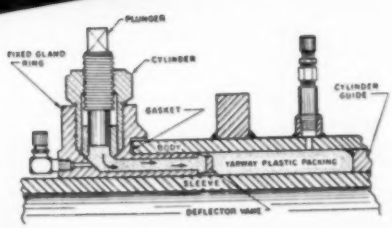
THE BIRD-ARCHER COMPANY, 400 MADISON AVE., NEW YORK 17, N. Y.
Philadelphia, Pennsylvania • Chicago, Illinois • Montreal, Canada
CALDERAS Y ACCESORIOS, S. A. AMSTERDAM 291, MEXICO, D. F.

GUN-PAKT EXPANSION JOINTS

to maintain

require

for servicing



Close-up of cross-section showing detail of Gun-Pakt feature.

YARWAY

Maintenance costs are less because there's less maintenance.

In a nutshell, that's why more and more utilities, institutions and industrial plants distributing steam are turning to Yarway Gun-Pakt Expansion Joints.

Servicing Gun-Pakt Joints never interrupts heating or production. They are serviced under full steam pressure, without shutdowns.

To repack a Gun-Pakt Joint you simply insert a plug of plastic packing, turn a wrench, and the job's done. Special Alemite fittings provide for proper lubrication.

Users report that Gun-Pakt Joints cost little to maintain. One who has kept accurate records says "65 cents per year per joint." Others claim even less.

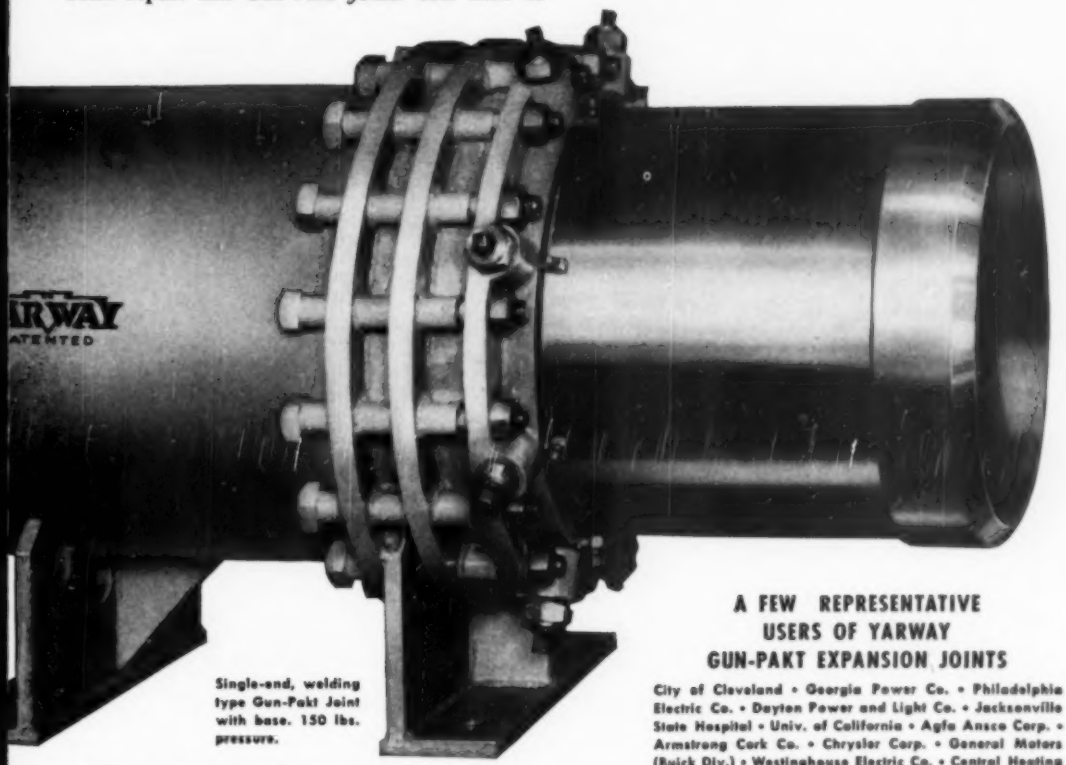
Available with single or double ends, welding or flanged types, in sizes from 2" to 30", with traverses from 4" to 24", and for pressures to 400 psi.

For the full Gun-Pakt story, as well as information on other Yarway slip-type joints, write for Yarway Bulletin EJ-1912.

YARNALL-WARING COMPANY

Home Office: 116 Mermaid Ave., Philadelphia 18, Pa.

Southern Representative: ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.



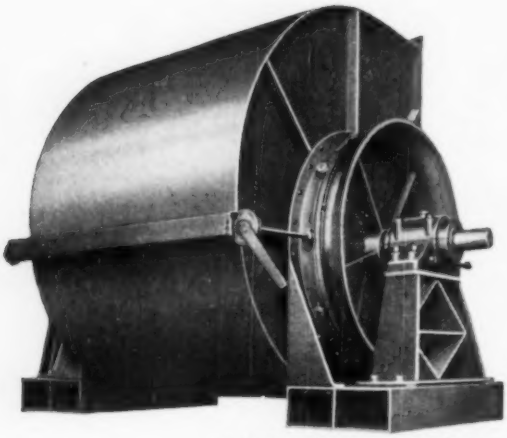
Single-end, welding type Gun-Pakt Joint with base. 150 lbs. pressure.

A FEW REPRESENTATIVE USERS OF YARWAY GUN-PAKT EXPANSION JOINTS

City of Cleveland • Georgia Power Co. • Philadelphia Electric Co. • Dayton Power and Light Co. • Jacksonville State Hospital • Univ. of California • Agfa Ansco Corp. • Armstrong Cork Co. • Chrysler Corp. • General Motors (Buick Div.) • Westinghouse Electric Co. • Central Heating Plant, Washington, D. C.

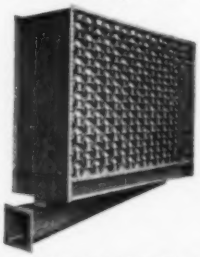
Yarway products at the National Power Show, Grand Central ce, New York, November 27 to December 2. Booths 65 and 66.

Worth looking into (we say)...
AMERICAN BLOWER HS FORCED DRAFT FANS



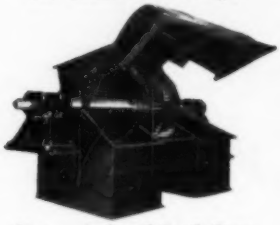
American HS Forced Draft Fan

Heavy Duty Coils

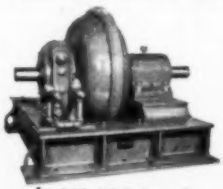


Type ST Fly Ash Precipitators

Gýrol Fluid Drives for Boiler Feed Pumps



Sirocco Induced Draft Fans



Gýrol Fluid Drives for Mechanical Draft Fans

We are particularly proud of our American HS Forced Draft Fan (shown above), designed specially for forced draft applications in power plants.

Over the years, refinements in design and proportions have materially increased static efficiencies. The streamline inlet overlapping wheel rim prevents entry loss and turbulence and aids in obtaining high efficiency. Housings are of heavy welded steel up to $\frac{3}{8}$" in thickness, with flanged outlet connections, and are reinforced for maximum rigidity.

We'd like to give you the complete story on our HS Forced Draft Fan, including performance curves, placement suggestions and other important factual data. Just send for our Bulletin 4424 or call our nearest branch office for a copy.

And, if you'd like complete data on other American Blower Mechanical Draft Equipment as well as on Fly Ash Precipitators, Heavy Duty Coils and Gýrol Fluid Drives for fan control and boiler feed pumps—merely write, stating your requirements, or phone our nearest branch office.

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of American Radiator & Standard Sanitary corporation

YOUR BEST BUY AMERICAN BLOWER POWER PLANT EQUIPMENT

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AMERICAN-STANDARD · AMERICAN BLOWER · CHURCH SEATS · DETROIT LUBRICATOR · KEWANEE BOILERS · ROSS HEATER · TONAWANDA IRON

DIAMOND DOMINATES
IN SOOT BLOWERS

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*Central Illinois Electric & Gas Co.
Rockford

*Central Illinois Public Service Co.
Hutsonville

Cincinnati Gas & Electric Co.
Clermont

Illinois Power Co.
Hennepin

Indiana & Michigan Electric Co.
Tanners Creek

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*Northern States Power Co.
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SOUTH

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Meramec

*REPEAT CONTRACTS FOR SAME STATION

In 1950, as in '49, '48, '47, etc., leading public utilities are indicating nationwide preference for Diamond Soot Blowers. Conclusive evidence is in this list of central station contracts (complete steam generators only) above 600 psi for the first eight months of 1950. TODAY . . . as yesterday . . . Diamond Dominates in soot blowers.

DIAMOND POWER SPECIALTY CORP.
LANCASTER, OHIO
Diamond Specialty Limited — Windsor, Ontario

BETTER BOILER CLEANING AT LOWER COST
Is the Reason Why
DIAMOND DOMINATES

"Marshalling the forces of advertising to help solve national problems and to make democracy work better . . ."

DO YOU KNOW that the forces of advertising are engaged today in one of the world's greatest jobs of mass education . . . *in the public interest?*

Do you know that these forces for good have been released through the vision and unselfish cooperation of American business – advertisers, advertising agencies, media owners and others?

Hundreds of advertising agencies have volunteered their planning and creative time and facilities. Artists, cartoonists, photo-engravers, printers, typographers and others have contributed their services.

Media owners have donated millions of dollars in space and time. National and local advertisers have sponsored and paid for many millions of public service advertising messages.

As a result, the American people are being alerted as never before to the dangers which threaten from within and from without . . . the dangers of ignorance about our American economic system, intolerance, tuberculosis, school and teacher shortages, etc.

And, at the hub of this great public service effort is *your* organization . . . The Advertising Council.

Advertisers and Media Owners . . . Your Help is Needed!

Right now The Advertising Council has 14 programs in operation. The success of these programs depends on the public spirited and generous cooperation of advertisers and media owners. *Your* help, in the form of space or time donations, will mean a lot to us. And remember . . . *What helps America helps you!*

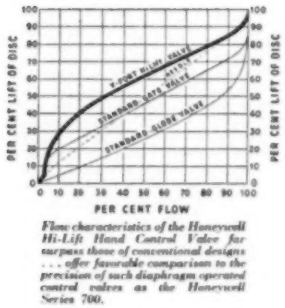
Yours for the Asking

Write for a copy of Booklet No. 15. It will give you pertinent information about The Advertising Council . . . how it started . . . what it is . . . what it does . . .Or ask for material on specific campaigns. Address: – The Advertising Council, 25 West 45th Street, New York 19, N. Y.

Published in the public interest by

SOUTHERN POWER & INDUSTRY

*A NON-PROFIT ORGANIZATION FORMED TO UTILIZE ADVERTISING IN THE PUBLIC GOOD



Flow characteristics of the Honeywell Hi-Lift Hand Control Valve far surpass those of conventional designs . . . offer favorable comparison to the precision of such diaphragm operated control valves as the Honeywell Series 700.

THE Honeywell Hi-Lift Hand Control Valve is ideal for use where automatic regulation is not necessary or advisable. Designed to afford micrometer adjustment of flow, it contains an indicating scale to show percentage of stem travel to 1% and an inner valve capable of responding to such close correction. Inset illustration shows the simple and easy-to-read scale and the curve at left portrays the superior flow characteristics of the Hi-Lift over conventional valve designs.

The Honeywell Hi-Lift is available with v-port or parabolic discs . . . in sizes from ¼" to 12" . . . straight through or angle . . . for pressures up to 600 lbs. . . . with body of Bronze, High-Tensile Iron or Cast Steel . . . and with Bronze or Stainless Steel trim. Available, too, with electric motor for remote control applications.

Call in your local Honeywell engineer for detailed information about the Hi-Lift and such other Honeywell Process Control Specialties as: Transfer Valves, Liquid Level Devices, Cylindrical Plug Valves and the Honeywell Space-Saving Bypass. *Write, today, for a copy of Bulletin #242-1!*

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 1902 Windrim Avenue, Philadelphia 44, Pa. Offices in more than 80 principal cities of the United States, Canada and throughout the world.

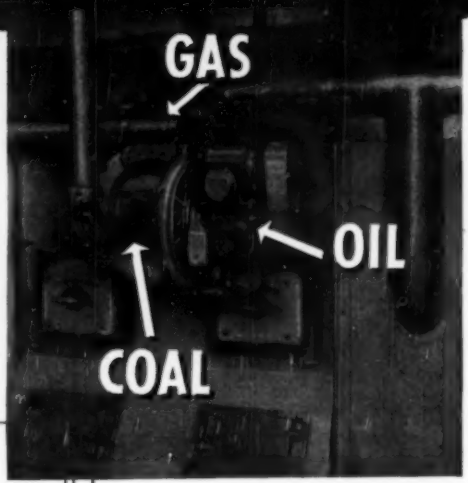
Honeywell
VALVE PRODUCTS

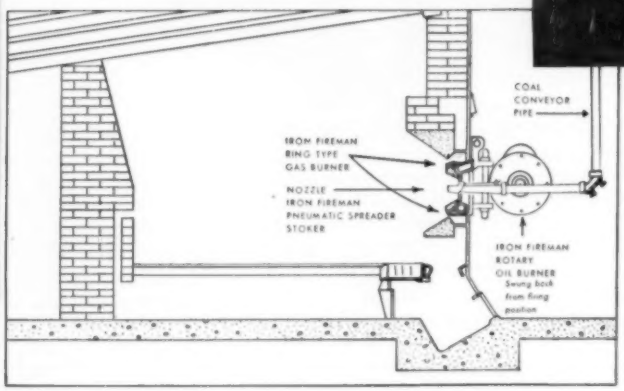
Iron Fireman Fires GAS, OIL or COAL in the same boiler

Switch fuels quickly

Guard your plant or buildings against possible fuel shortages. Protect yourself against high fuel costs. Equip your boilers to burn whichever fuel is lowest in cost or most readily available.

Iron Fireman builds and installs highly efficient automatic firing equipment for coal, oil or gas. It has also developed combination units for firing any two of these fuels—or all three—with quick changeover from one fuel to another.





Shown above is boiler front equipped for firing with coal, oil or gas. The Iron Fireman Pneumatic Spreader stoker delivers coal from hopper or from main coal bunker by pneumatic conveyor, and conveyor nozzle (shown here in firing position) accurately spreads the larger particles of coal over the entire grate in a shallow, uniform fuel bed. Preheated fines burn in suspension. For oil firing coal nozzle is withdrawn and Iron Fireman Rotary oil burner (for No. 6 oils or lighter) is swung into firing position. For gas firing the Iron Fireman Ring Type gas burner is used, in which stainless steel gas jets surround the firing port. In an emergency the fuel change can be accomplished in a few minutes.

Diagram at left shows three-fuel installation in straight tube boiler.

In many applications the Iron Fireman underfeed stoker can also be used in conjunction with the Iron Fireman gas-coal combination burner.

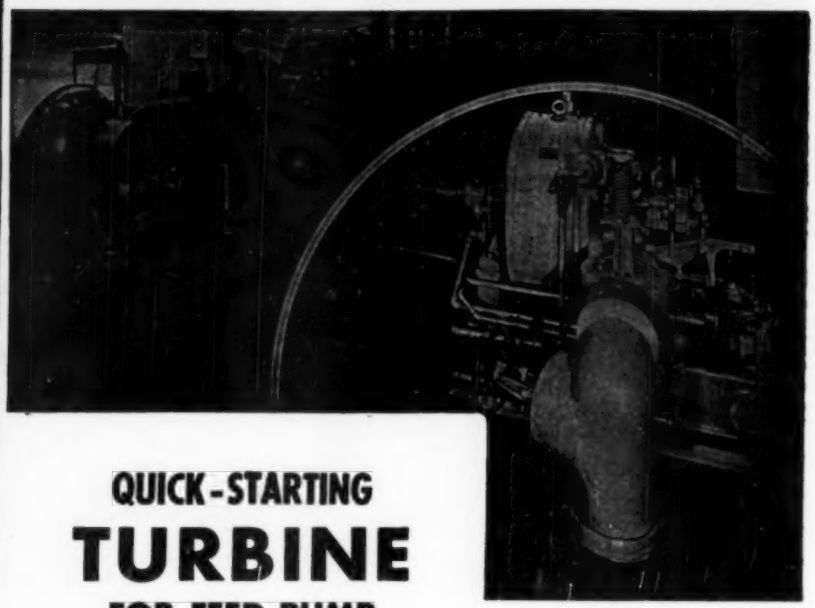
Iron Fireman engineers will gladly make a free survey of your boiler plant, and give you an estimate on firing equipment that will pay you new profits as well as insure you against losses due to changes in fuel prices and availability.

Write for illustrated folder to Iron Fireman Mfg. Co., 3250 West 106th St., Cleveland 11, Ohio. Plants in Cleveland; Portland, Oregon; Toronto, Canada. Sales, service and engineering organization covers the United States and Canada.

IRON FIREMAN

AUTOMATIC HEATING WITH GAS, OIL, COAL

TERRY



QUICK-STARTING
TURBINE
FOR FEED PUMP
EMERGENCY DRIVE

The turbine shown at the right picks up the feed-pump load in case the motor, which normally drives the unit, is inoperative. Thus the turbine must be able to start quickly and be completely reliable —characteristics which are assured by the generous blade clearances and one-piece construction of the Terry Wheel.

This is but one example of many special turbine requirements that are met by the Terry solid-wheel turbine. Details on how this and other Terry Turbines will meet your individual needs will be gladly supplied by a Terry engineer.

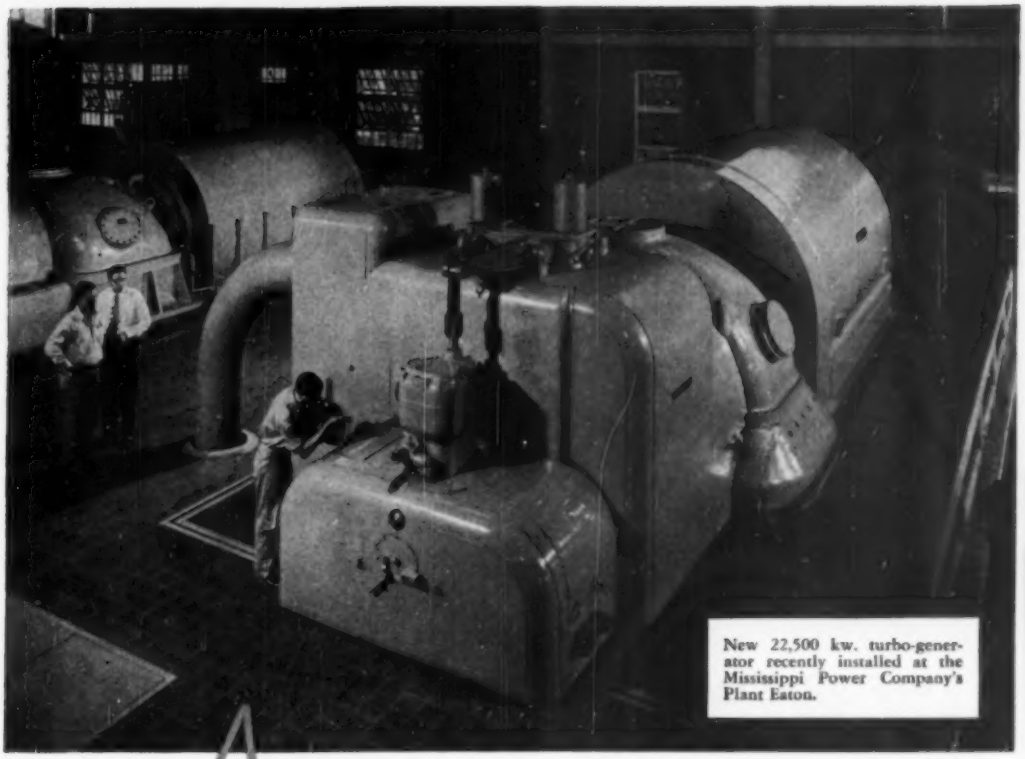
DATA

The turbine is 620 hp, 3550 rpm for 850 psi, 900F steam with 2.5 psi back pressure.

Installed in the Crawford station, Middletown, Pa., Metropolitan Edison Co. Gilbert Associates, Inc. were the consulting engineers.

T-1178

THE TERRY STEAM TURBINE COMPANY
TERRY SQUARE, HARTFORD, CONN.



New 22,500 kw. turbo-generator recently installed at the Mississippi Power Company's Plant Eaton.

Another progressive utility selects Gulfcrest Oil for new turbine unit

Another new turbine gets the safe, sure, long lasting protection of Gulfcrest, now more than ever the world's finest turbine oil!

Another case, too, where outstanding performance in other turbines operated by the same utility led to the selection of Gulfcrest Oil for the new units.

Extra refining makes the difference! After the carefully selected crude oil used in Gulfcrest goes through the major refining methods, it is then supperrefined by the Alchlor Process.

As much as 15 per cent of the oil is discarded by the Alchlor Process—this 15 per cent contains the hydrocarbons most apt to oxidize and form sludge, emulsifiers, and harmful acids.

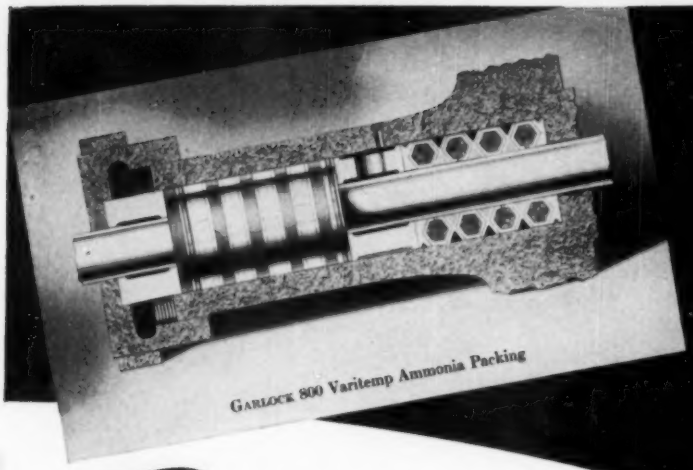
That's why Gulfcrest is incomparably pure—why it gives outstanding performance, and lasts indefinitely. Call in a Gulf Lubrication Engineer today for complete information on this superior oil. Write, wire or phone your nearest Gulf office.

Gulf Oil Corporation · Gulf Refining Company

GULF BUILDING, PITTSBURGH, PA.

Sales Offices - Warehouses
Located in principal cities and towns throughout Gulf's marketing territory

GULF INDUSTRIAL LUBRICATION



Precision

—FOR SUPERIOR PERFORMANCE

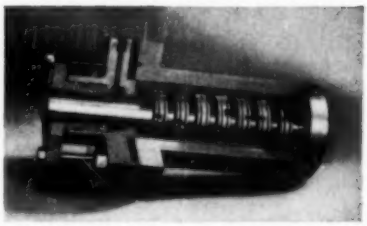
STAR performers excel because they are precise, accurate, dependable.

GARLOCK Metal Packings give superior performance for the same reasons. They are carefully designed by experienced Garlock engineers and accurately machined from metal produced to exacting Garlock specifications.

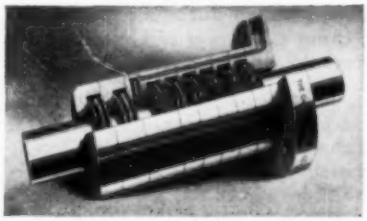
You can depend on Garlock know-how and Garlock quality controlled precision manufacture—for superior metal packing performance.

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK

In Canada: The Garlock Packing Company of Canada Ltd., Montreal, Que.



GARLOCK 835 Refrigeration Compressor Metal Packing



GARLOCK 875 Gas Compressor Metal Packing

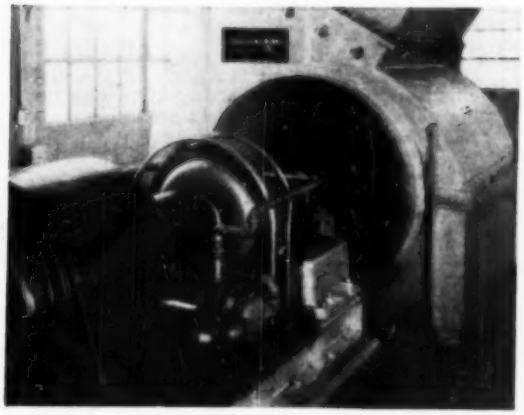
GARLOCK METAL PACKINGS

Consumers Power *Again* Selects

CLARAGE FANS

. . . for Both Forced and Induced Draft

Built in 1940 — enlarged to practically twice capacity in 1949 — and *both times* Clarage HEAVY-DUTY equipment was chosen for mechanical draft in this John C. Weadock plant, Bay City, Michigan.



One of the four Clarage forced draft fans; each 100,000 c.f.m. at 12" S.P. There are also two Clarage induced draft fans included in this latest Weadock power plant installation; each with a capacity of 330,000 c.f.m. at 17" S.P., 350° F.

CLARAGE FAN COMPANY
KALAMAZOO, MICHIGAN

All told, Consumers Power Company has had 24 years of experience with Clarage forced and induced draft fans. Other installations include: East Ave. Station, Kalamazoo (1926); Elm St. Station, Battle Creek (1938); Bryce C. Morrow Station, Comstock, Michigan (1939).

Specialists in this exacting field of mechanical draft, we have facilities to meet all requirements. To date over 3,000 power plants are Clarage equipped. If you are looking for the *best in performance* and *dependability*, it will pay you to consult with us.

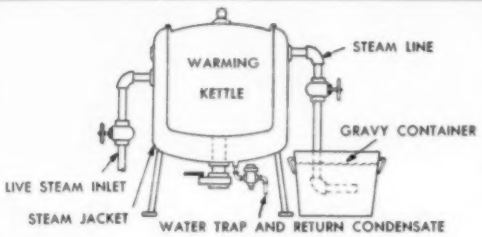
CLARAGE
—HEADQUARTERS for Air Handling and Conditioning Equipment

Sales Engineering Offices in All Principal Cities

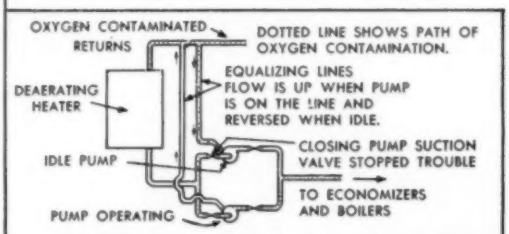
PERIODIC VISITS BY
Hall Service Engineers

The Hall service engineer who visits your plant periodically, as provided in the Hall contract, checks boiler water conditioning procedures with you, as a matter of course. Often, he is able in this way to "head off" trouble before it starts. That is not the end of his work, however, for he is prepared to help in virtually any problem connected with generating and using steam—and sometimes he traces trouble to an unexpected source.

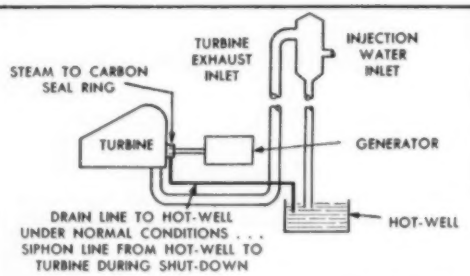
1. In one plant the boiler water was OK by plant tests, but the Hall engineer was sure that phosphate feed was too high. Checking, he found that phosphate tests were being made with too weak a test solution — and consequently showed less phosphate in the water than was actually present. Correcting this saved the client many dollars every day.



2. In another plant, where foaming occurred at frequent intervals, tests of the water at these times showed the presence of organic contamination. The Hall engineer traced this contamination to an "impossible" source—the plant cafeteria. On occasion, gravy was sucked back into the return condensate, by way of the steam jacket around a warming kettle!



3. At still another plant, increasing sodium sulphite consumption indicated to the Hall engineer that oxygen contamination was taking place. He traced this to a feed pump, and then the plant engineer remembered a feature of the piping arrangement which would, when one pump was idle, permit oxygen-contaminated condensate to leak into the pump suction. Closing a valve on the idle pump ended the difficulty.



4. In a New York brewery, pitting of turbine blades was blamed on carry-over of sodium chloride in the steam. Hall engineers were not satisfied merely to prove that the steam was pure, but also showed that the pitting occurred when the turbine was idle. Following this lead, it was found that the drains from the turbine seal rings were piped into the barometric condenser hot well, which contained salt water. When steam condensed, brine was siphoned into the turbine.

These incidents illustrate some of the varied ways in which Hall engineers help Hall clients, even when the boiler water conditioning is not involved. They also illustrate why so many plants, year after year, continue to use Hall service.

Hall Laboratories, Inc., Hagan Building, Pittsburgh 30, Pa.

HALL LABORATORIES, INC.

(A Subsidiary of Hagan Corporation)

CONSULTANTS ON
INDUSTRIAL WATER TREATMENT
HALL SYSTEM OF BOILER WATER CONDITIONING
INDUSTRIAL WASTE RECOVERY AND DISPOSAL

Keep heat and heating costs from

"HITTING the CEILING"

THIS WINTER, why not see that you get *all* the heat you are paying for? Let Thermolier Unit Heaters bring both your heat—and your heating costs—down to a *reasonable* level.

HEATING COMFORT Thermolier Unit Heaters provide quick heating from a cold start. Desired temperatures are easily maintained within a close range. Heat is uniformly distributed in the working zone by forced air circulation. It is a very flexible system because different or changing heating requirements are easily satisfied by means of different models, a range of capacities, single — or two-speed motors and individual thermostatic controls.

LOW FIRST COST Thermolier Unit Heaters are so efficient and so compact that their heating capacity is often equivalent to the capacity of cast iron radiation or pipe coils of twice the cost. Additional savings are effected because the system requires a proportionately smaller amount of pipe, fittings and accessories.

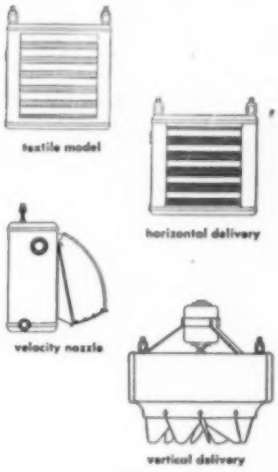
ECONOMY OF OPERATION Heat is forced down to the working level . . . not banked uselessly at the ceiling level. Heat is turned on and off merely by throwing a switch either manually or automatically by simple thermostatic controls. The rapid response means that heat is furnished only when and where it is wanted . . . no heat is wasted.

ADAPTABILITY TO EQUIPMENT AND FLOOR LAYOUT Thermolier Unit Heaters are widely used in industrial plants and warehouses, garages, stores and public buildings. The units and the simple piping are overhead where they do not interfere with arrangement of operating machinery or equipment and do not take up valuable floor or wall space. Units are easily relocated at any time to meet changes in layout.

THERMOLIER UNIT HEATERS HAVE IMPORTANT CONSTRUCTION ADVANTAGES The design of Thermolier Unit Heaters is the product of Grinnell Company's 100 years of heating experience. Heating experts like Thermolier's dependable operation, freedom from maintenance troubles and durability. Typical of its construction features is the patented internal cooling leg which permits the use of a plain thermostatic trap, the simplest, least expensive kind of a trap. Other features are built-in drainage, continuous rated capacity and provisions for expansion of U-tubes.

Get in touch with Grinnell or your local Thermolier distributor.

There is a type and capacity of Grinnell Thermolier for maximum heating results under every condition.



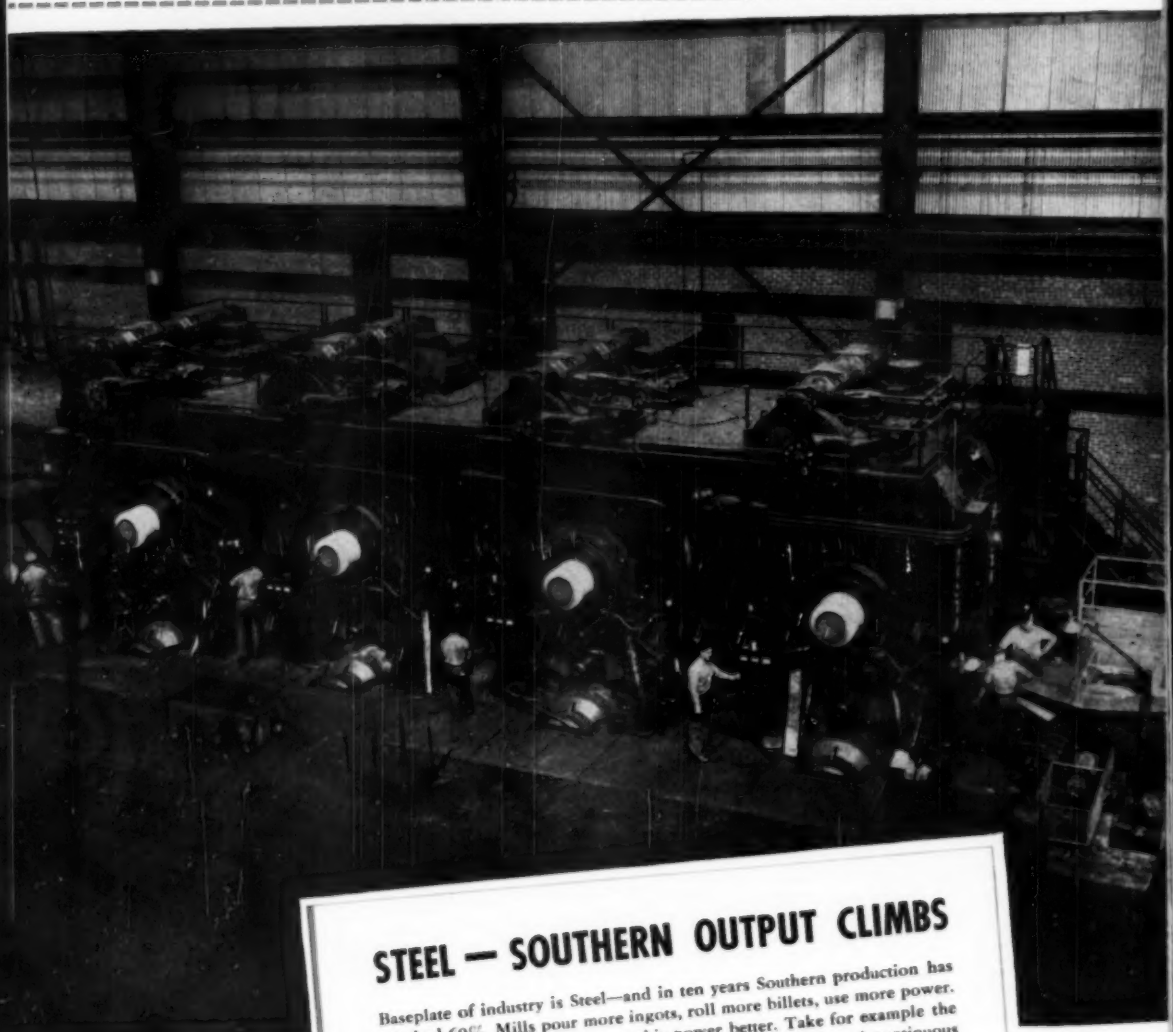
GRINNELL

THERMOLIER UNIT HEATERS

Grinnell Company, Inc., Providence, R. I. Branches: Atlanta • Billings • Buffalo • Charlotte • Chicago • Cleveland • Cranston • Fresno • Kansas City • Houston • Long Beach Los Angeles • Milwaukee • Minneapolis • New York • Oakland • Philadelphia • Pocatello • Sacramento • St. Louis • St. Paul • San Francisco • Seattle • Spokane

YOU CAN BE **SURE**.. IF IT'S

Westinghouse



STEEL — SOUTHERN OUTPUT CLIMBS

Baseplate of industry is Steel—and in ten years Southern production has climbed 60%. Mills pour more ingots, roll more billets, use more power.

Westinghouse helps them use this power better. Take for example the high-speed rolling mill shown above in a big Southern plant. A continuous steel strip races through the rolls, whips out of the last roll-stand at 35 mph. In each stand, thickness is reduced and the strip gets longer. So each stand must run faster than the last one. To avoid stretching the strip, speed relationships must be held with hairline accuracy—a tricky problem.

Westinghouse solved it with Rototrol,® the almost-human electrical intelligence. Rototrol automatically measures and regulates the voltage supplied the giant Westinghouse motors driving the rolls, keeps their speed ratios precisely synchronized. This kind of thinking (and it can be applied to *your* problems) helps Southern industry produce faster—and more.

WHY IS SOUTHERN POWER OUTPUT UP 2½ Times?

Take a look at these bright figures. In 1939, the generators in Southern power plants spun out 30 billion kilowatthours. The figure just nine years later: *78 billion kwhrs.* That's a boost of 161%, a growth rate 23% over the U. S. average!

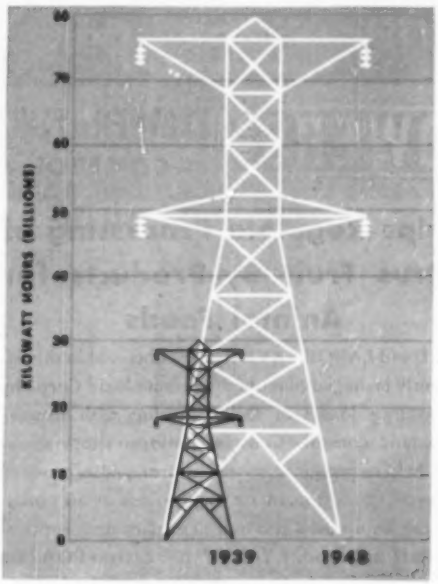
What's behind the big jump? The major factor: industrial growth. In the last ten years, the total sales-dollar return of Southern industry has rocketed 3½ times higher. And with industry using over ¾ of Southern power, you can see where the new KW's are going!

Many individuals and many organizations are responsible for this outstanding record. Westinghouse is proud to be among them. A big percentage of Southern power is generated in equipment engineered by Westinghouse. And simultaneously, first-rate Westinghouse equipment helps Southern industry *use* this power to best advantage—and thus expands power consumption and industrial output.

Much of this apparatus is produced by the 4,000 Westinghouse employees in our thirteen Southern plants—for early in the company's history, Westinghouse saw the advantages of manufacturing in the South.

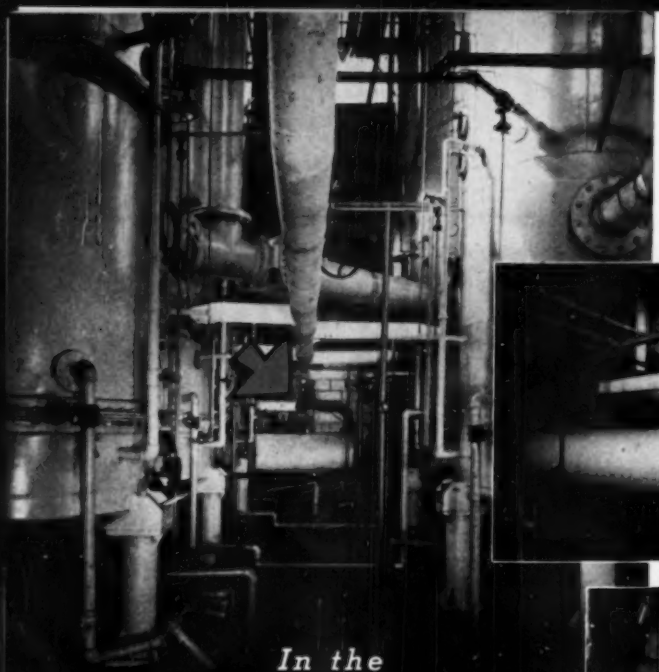
Westinghouse has been in the South for a long time as a supplier, producer, and customer. We know the needs and problems because they're ours as well. Your Westinghouse office is a good place to go for help in expanding power capacity and getting the most out of it.

J-94829



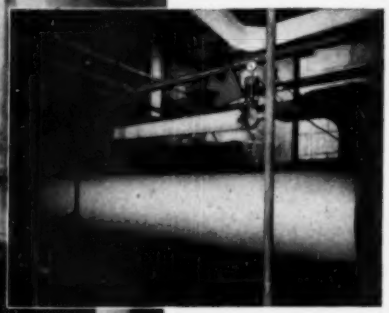
Westinghouse

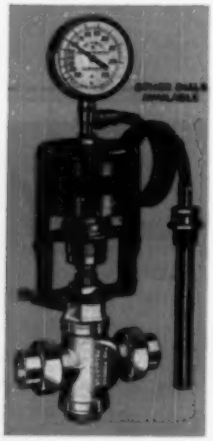
A BASIC PART OF THE SOUTH



In the
Minute Maid Corp.,
Plant at Leesburg, Florida

POWERS No. 11 Self-Operating TEMPERATURE INDICATING REGULATOR. Has easy to read 4" dial correctly gives temperature of pulp and liquid being heated before entering evaporators. Regulator valve controls steam supply to large heater shown below.





POWERS **TEMPERATURE CONTROL**

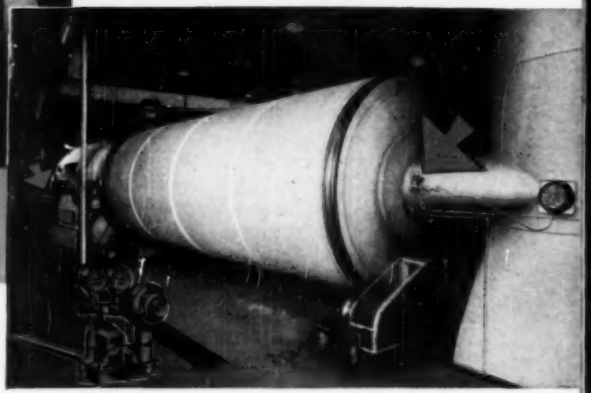
Helps Regulate Processing of Citrus Fruit By-Products for Animal Feeds

FUEL and LABOR SAVINGS are obtained in this efficiently managed plant of the Minute Maid Corp., by preventing losses of OVER-heating with Powers automatic control. Constant uniform temperatures also help to produce a more uniform quality product.

If you want to maintain any process or air conditioning equipment at a more constant uniform temperature or humidity, contact your nearest POWERS office for help in selecting the right control for your requirements.

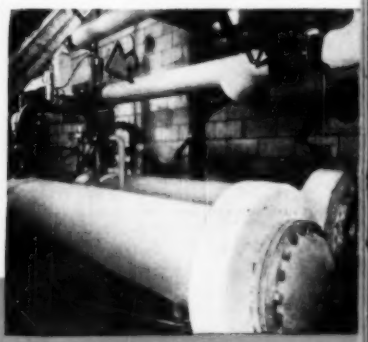
With almost 60 years of experience and a wide variety of pneumatic and self-operated regulators POWERS engineers are well qualified to help you get the most value for your money. Phone our nearest office or write—

(MMC)



Above: POWERS Air Operated No. 10 TEMPERATURE REGULATOR controlling valves on Oil Burners and Dampers of HEIL CO. ROTARY DRYER.

Below:
POWERS No. 11 Self-Operated TEMPERATURE REGULATOR automatically controlling steam supply to large double cylinder heater.



THE POWERS REGULATOR CO.

OVER 59 YEARS OF AUTOMATIC TEMPERATURE CONTROL • OFFICES IN OVER 50 CITIES • SEE YOUR PHONE BOOK

CHICAGO 14, ILL., 2793 Greenview Ave. • NEW YORK 17, N. Y., 231 E. 46th St. • LOS ANGELES 5, CAL., 1808 W. Eight St. • ATLANTA 3, GA., 142 Spring St. N.W.

Flanged bonnet, welding end, high pressure, gate valve.

WHEN YOU WANT

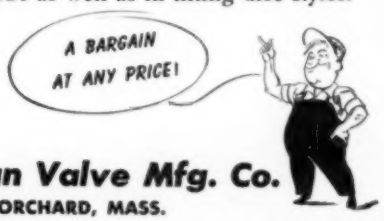
BOTH Precision and Economy

Specify CHAPMAN STEEL VALVES

Want valves with precision ratings that equal or exceed standard specifications? Then specify Chapman Valves. You'll find them the equal of custom-made valves *every time.* Yet they are economical — with the economy that comes from production line manufacture.

You'll find it will pay to specify Chapman valves for every power plant need . . . for longer service, for better service, for lower maintenance.

Available in three types of body and bonnet connections — welded, pressure sealed or flanged. Also in gate, globe, angle, or check types. Welding end valves available in globe as well as in tilting disc styles.



The Chapman Valve Mfg. Co.
INDIAN ORCHARD, MASS.

Timely Comments

A Card Game That Pays

THE ARTICLE on page 62 by Robert J. Tucker, plant engineer, Roanoke Mills Co., Roanoke Rapids, N. C., suggests a little card game that should prove profitable.

Take a simple diagram of your electrical supply system like the one shown in the article and number each piece of equipment—each transformer, each circuit breaker, each disconnect, each arrestor, etc. Then make a card for each number, listing name plate data, age, condition, etc.

Now you are ready to start the card game.

Imagine a failure of each piece of equipment and write down on the card what you would do. Could you by-pass the failure and keep the plant going while repairs are made? Do you have necessary spare parts? Next decide how likely it is that such a failure will occur. Consider age, condition, overload, and other conditions that might contribute to trouble.

Now you are ready to start playing for stakes. What are the odds on each card? How likely is a failure? How much would it cost? What would be required to reduce the hazard.

Here's where the engineer, the electrician, and the production supervisor should get their heads together. Play the game realistically—figure cost of improvements against production loss and set a program.

You will find the card game pays off. You can't lose by planning ahead. Don't let service failures take you by surprise.

◆

Worried New Englanders

ONE OF THE SUREST SIGNS of Southern progress in science and industry is the loud complaint of New Englanders that there is no justification for industry to move in this direction. **H. McKinley Conway, Jr.**, editor of The Journal of Southern Research in Atlanta notes that "New England groups, spurred by our rapid development, are arousing themselves to promote the very ideas which have sparked our progress."

Speaking before an audience in Boston recently, an official of a large chemical concern emphasized this theme: "New England offers chemical manufacturers three advantages: it is close to one of the most active research centers in the country; it is close to a major market for the consumption of chemicals; it has ready access to deep water and can, therefore, import raw materials cheaply."

The New Englanders are worried because they know the South already has the raw materials and the deep water, and is developing the research centers. And, as Mr. Conway points out, "We'll be glad to supply their markets."

◆

Experience Knowledge Ability

"EXPERIENCE, KNOWLEDGE AND ABILITY is never subject to economic inflation or deflation, and it is something that you can spend fully and still have its full value. With it you should strive for those accomplishments by which you are respected for your authority, admired for your personality and loved for your character."

Robert S. Lynch, president of the **Atlantic Steel Company**, Atlanta, Georgia, speaking before the September graduating class of the **Southern Technical Institute**, emphasized that the greatest of men acquire nothing more and that graduating seniors should seek nothing less.

From more than 30 years steel industry experience, Mr. Lynch notes several important developments that have increased the need for trained and experienced personnel.

Developments of the metallurgical values of nickel and moly in the first World War (alloy steels) created a demand for **chemical engineering technicians.**

In 1920, the start of modern assembly lines (automotive) created a demand for **metallurgical engineering technicians.**

The necessity of reducing costs in the early 30's created a demand for the **industrial engineering technician.**

Organization of labor, which started in 1937 created the bargaining table and the **industrial relations departmental personnel.**

In these transitory periods, there was a great need for men who had training, knowledge and ability to direct and supervise the men-on-the-job and organize their efforts to the satisfaction of management and the mutual benefits of both men and management.

Mr. Lynch stressed that today there is a movement in industry toward decentralization through delegation of authority. Accordingly, there must be people capable by training, experience, and with ability, who can properly handle this delegation of authority.

To the graduates of the Southern Technical Institute, Mr. Lynch stressed that they had just finished the first phase of acquiring this ability. It was not something that happened in the past few months or the past few years—but had been going on for a long time, and it will take a long time for it to reach its full effective value. This can only be done by education.—**LEARNING BY DOING.**

This close-up clearly shows the ribs or corrugations which add strength to Childers Jacketing and also make it form more easily around lines. Aluminum strapping and seals are a quick, inexpensive way to attach the jacketing. They can be used without any special tools and take no special training for the installers.

Does long lasting aluminum cost too much for covering your insulated lines? Not when you specify this new type weatherproof jacketing. It has been specially developed to cost little more than ordinary temporary jacketing materials.

New Low-Cost Jacketing Cuts Maintenance on Insulated Lines

AT LAST an aluminum jacket has been "engineered" especially to protect outdoor lines in power, chemical and other processing plants. It is the first "permanent-type" jacketing that offers both low initial cost and low application cost.

After two years of tests and major installations at 431 outdoor locations in power plants, chemical plants and refineries, the Childers Manufacturing Co. of Houston has rung up an impressive cost-cutting record with their Childers Aluminum Jacketing.

Secret sheet—.006" thick—which is the weather-protecting sheath of the jacketing. It is ribbed (as pictures show) for extra strength and to facilitate forming around the line. This aluminum has proved thick enough to resist weathering and usual abrasion, but costs much less than heavier aluminum sheets.

Easy application of this Childers Jacketing cuts labor bills drastically. It comes from the factory in easy-to-handle rolls that are four feet wide and either 100 feet or 200 feet long. It is light and flexible to handle as the men put it on the line. No roll forming required as with heavy, un-crimped material. It can be cut off and attached just the same as the old-fashioned tar-paper that was sometimes used for jacketing.

You can attach Childers Jacketing around your insulated lines by one of several easy methods. The use of aluminum strapping and seals is probably the best. Sheet metal screws or Minnesota Mining's No. 471 tape can also be used.

The Childers jacketing can be removed and re-used.

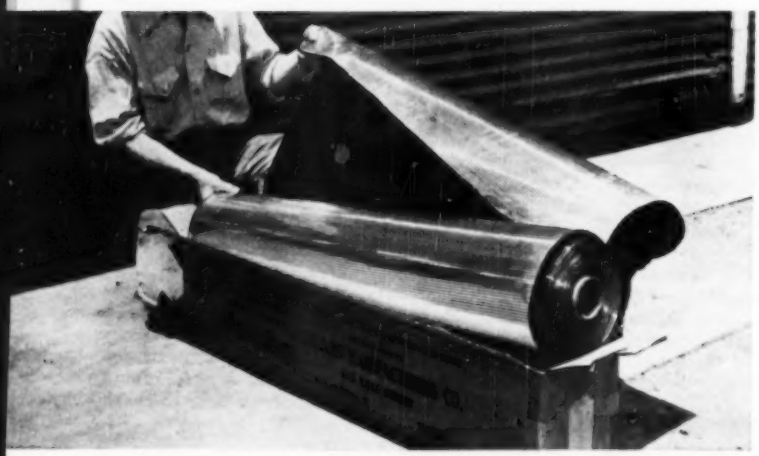
A moisture barrier is attached to the back of the jacketing to give positive protection for the aluminum when it is used with alkaline insulating materials.

No painting, no rust-proofing, little maintenance — that's the advantage of aluminum!

Hundreds of design engineers and maintenance engineers have agreed they save money for their firms and trouble for themselves by changing their jacketing specs to Childers 100%. That should make it worth your testing too—and a test roll costs only $36.00 for 400 sq. ft. (with moisture barrier attached—price for jacketing without moisture barrier much less). That's a good investment in any plant. (Advt.)

* * *

FOR FULL INFORMATION write Childers Manufacturing Co., Dept. SP-1, 625 Yale St., Houston 7, Tex., for complete literature. Childers has engineering representatives in principal cities to work with you on specific problems.



This is how Childers Aluminum Jacketing is shipped in easy-to-handle rolls. It is quite flexible, yet stands up under severe weathering.

(Advertisement)

Industry Speaks

Pension Problems of Small Business

Abstract of a talk presented by Mr. William J. Baroody of the U. S. Chamber of Commerce at the recent Southeastern Personnel Conference held at Duke University.

LESS than 2 per cent of the nearly 4 million business firms in the United States employ more than 50 workers. In the aggregate, small business is responsible for the employment of about half the wage earners of the country, but relatively few such businesses consider the current pension drive as directly related to their enterprise.

The end of productive employment for today's oldster leaves him with two possible means of support: relief, or retirement benefits. Personal savings, on the average, prove inadequate. Relief, whether of a private or governmental nature, is not the solution.

Retirement benefits are provided today both through public and private methods. The Federal old-age insurance program is intended to furnish a "floor of protection." It is not meant, nor should it be expected, to do the whole job. The recently enacted amendments make substantial improvements in the system, and at least move in the direction of universal coverage.

Three Level Approach

The retirement benefit approach to the problem is essentially a three-level concept. The foundation is a universal, contributory, earnings-related benefit system administered by government to provide a minimum subsistence. The second level comes out of the joint efforts of management and labor in the form of private pensions designed to meet the needs of a given group within the ability of the company to pay. The final level can depend only on the thrift and individual desire of the worker himself—home ownership, bond purchases, life and annuity insurance, etc.

What is the small businessman's concern with all this? Most pay reasonably good wages and maintain good working conditions. Do their obligations go beyond this? The simple fact is that, for the most part, the choice of "pension plan" or "no pension plan" is academic. If a union demands pension negotiations, the Taft-Hartley Act requires the employer to bargain the issue in good faith. Eventually, some sort of pension scheme is born. If no union exists, competition with other employers for better help will produce a similar result.

The question then is what kind of plan and how to establish it. Integration with social security benefits is almost a "must" in order to qualify the plan for tax deduction purposes. The major problem is financing the plan. Here, there are several choices, and the one selected should be custom tailored for the particular business.

1. **Pay-as-you-go method.**
2. **Trust method.**
3. **Insurance.**
   a. **Group annuity.**
   b. **Deposit administration.**
   c. **Individual contracts.**
4. **Book reserves.**
5. **Profit sharing.**
6. **Combinations of any of the above.**

In focusing his attention on the problem of the aged, the businessman is confronted with the need for a re-examination of national policy in this entire area. Such questions as these demand answers.

1. If, as population experts predict, eventually more than 30 per cent of our population will be 65 or over, shall we retire one-third of our people? Can we afford that kind of society?

2. Will the remaining group be able to produce enough for all?

3. As techniques for utilizing the skill of older workers develop, can we reasonably continue policies of compulsory retirement at a specified age?

4. If pension funds continue to multiply and are invested in bonds, will this shut off or decrease materially the much needed supply of venture capital?

5. Should trusts and insurance companies be permitted and encouraged to invest in common stocks?

The responsibility of the individual businessman does not cease with the analysis of his company's pension needs and the creation of its pension plan. The extension of the pension drive, the trend toward universal adoption are potent factors in the national economy. Their effects should not be underestimated, but must be anticipated and sound national policies devised to meet the problem.

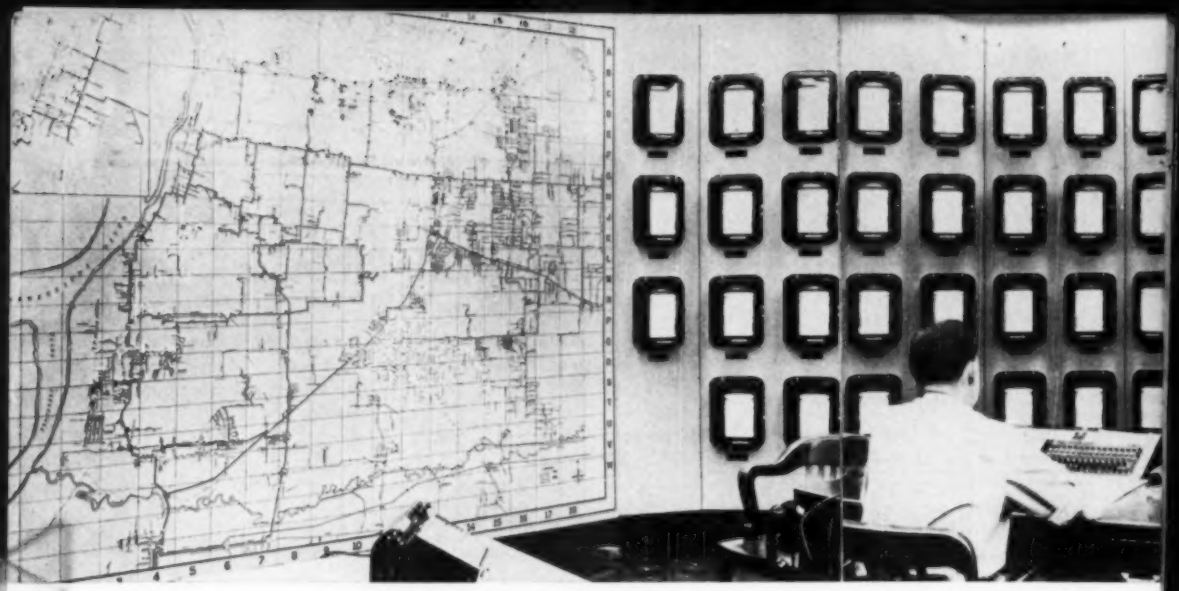
Consideration of the entire problem suggests these recommendations:

1. That a sound system of Federal old-age benefits aimed at providing a minimum floor of protection on a universal basis be the foundation of our national policy on security for the aged.

2. That private pension plans, as supplementary devices, be based on an intelligent evaluation of employee needs, company experience, and the extent to which the plan can go without jeopardizing financial stability.

3. That the pension plan be custom tailored for the company, not in the "heat of battle" but over a period of time when full weight and consideration can be given to the facts of company earnings, employee characteristics, turnover rates, and hidden pension costs in current payrolls.

4. Finally, that the businessmen must take the initiative in shaping national policy for the security of the aged if the danger of relying on public relief for the aged, rather than on an orderly system of retirement benefits, is to be avoided.



THE DISPATCHER CAN READ THE PRESSURE AT VARIOUS POINTS IN THE CITY FROM 93 RECORDING INSTRUMENTS ON HIS BOARD. PRESSURE AT NUMEROUS CONTROL

Telemetering and Pressure Control

Too much pressure causes leaks, too little causes complaints. Correct conditions are maintained for Memphis through adequate instruments and controls.

BECAUSE of the increasing gas demand in Memphis, it was found necessary in 1944 to establish a twenty-four hour Gas Dispatching Department, which would have complete supervision of our entire Distribution System. With the organization of this department, it was further realized that better co-ordinated pressure control of the system was an absolute necessity.

Keeping this in mind, the subject of remote control by telemetering was advanced, and the Division already having in service a large amount of private telephone cable—maintained by its Electrical Department—felt that with this advantage such controls could be economically adapted to our Distribution System, as it would not be necessary to rent or lease telephone cable for the purpose.

Another deciding factor in justifying and authorizing controls was the feeling that over a period of time the reduction in unaccounted for gas alone would go a long way toward paying its cost. Naturally our main objective was rendering good customer service. We felt that we would be better able to anticipate pressure variations in the system by the use of check-point telemetering, and that pressure control could be accomplished primarily by lowering pressures in district regulators at times when the demand is not so great and increasing in the same manner when demand increases. When high pressure is carried unnecessarily, gas losses are created, and regulator crews could not move fast enough to make needed adjustments.

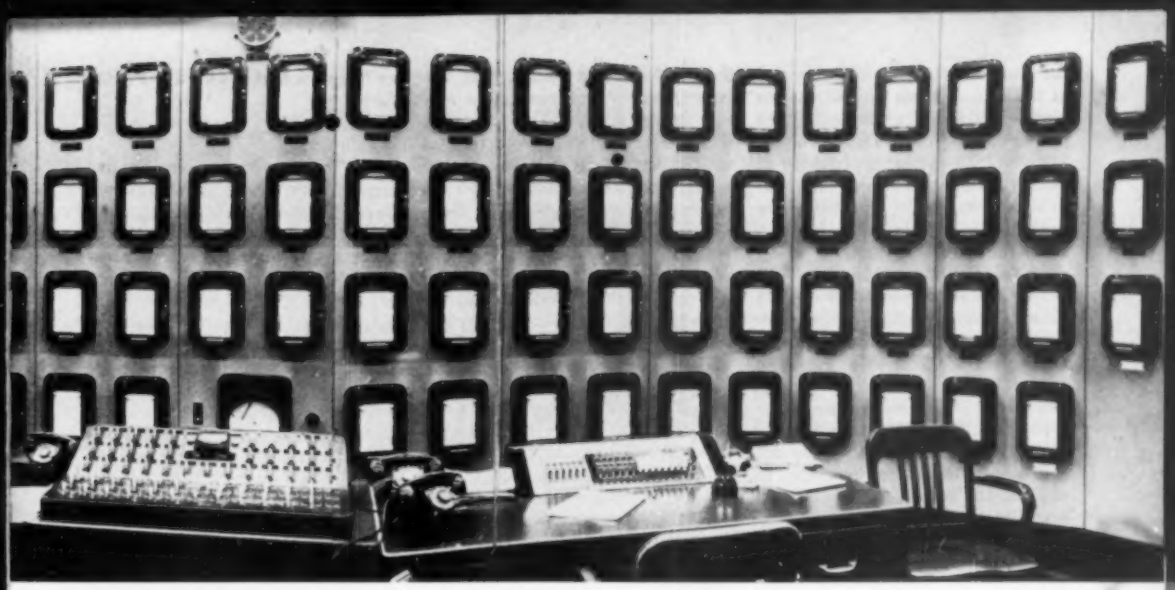
Control Stations

It was soon apparent that some type of systematic control should be established and therefore our plans were laid accordingly, incorporating a long range objective with an ultimate installation consisting of at least sixteen (16) remote controls of high to medium or intermediate, twenty-four (24) intermediate to standard, and ten (10) high to standard pressure district regulators—a total of fifty (50) controllers, requiring one hundred (100) recording instruments. In addition, there are to be approximately thirty-six (36) check-points located at strategic points throughout the system, and four (4) weather recording instruments.

Some regulator vaults under this program required rebuilding or enlarging, particularly those which were old and in a bad state of repair. In their design, not only is telemetering accommodated, but safety is stressed to the utmost.

Dispatching System

At the present time, our system has in operation approximately 469 pair miles of telephone cable which includes check-points, telephones and controllers—the longest being 5.67 miles from Dispatching Room and the shortest 350 feet. Cable extends from all points designated in the system and transmits to the



POINTS CAN BE RAISED OR LOWERED BY MOVEMENT OF THE SMALL SWITCHES OF THE TABLE. THE DIAGRAM AT LEFT INDICATES LOCATIONS OF VALVES AND REGULATORS.

—Memphis Gas Distribution System

By Hubert G. Howell

Chief Engineer, Gas Division
Memphis Light, Gas, and Water
Division, Memphis, Tennessee

Gas Dispatching Department's board, which is located in our service building at Beale and Walnut. Four pairs of wires are usually required for the average regulator control installation: one pair for the controller itself, two for pressure recording and one pair for telephone. In these installations we transmit and record both inlet and outlet pressures. The controller, transmitters, power-pack and telephone are located in a weatherproof, cast iron instrument box, as illustrated. Electrical service is required at both the transmitting and recording end of the system to operate a small electric clock-type synchronous motor, but requirements for this function are negligible.

Thirty day strip-chart type pressure recording instruments are installed on the gauge board. When charts are removed, they are easily filed for future reference. The large picture at the beginning of this article shows ninety-three (93) instruments of the contemplated one hundred and forty (140) on the board. Forty (40) of these instruments in operation and fifty-three (53) of those shown are now awaiting field completion.

The Dispatching Department makes no attempt to control the City Gate pressures of transmission lines, but does receive inlet and outlet pressure recordings of the lines on our board. The transmission company maintains required pressure at the City Gate which is usually 100 pounds. When additional pressure is required the Gas Division Dispatchers phone our needs to the Transmission Dispatcher at the City Gate over a direct line.

System Operation

In our Telemetering and Control System we have now reached the stage where we are now more or less out of the woods. We have had the opportunity to observe results since our first controller went into operation in May, 1948, and with one minor exception which has been corrected, performance has proven satisfactory in every way.

In our system we use both Bristol and Foxboro Controls, depending on the pressure involved. Both instruments provide the means whereby the Gas Dispatcher can add to, or reduce, the effective weight on the remotely located regulators, consisting of a pressure measuring system suitable for the range of gas pressures involved and including a standard proportioning type control mechanism. The output air from this pressure controller is then taken to a diaphragm motor lever, which in turn raises or lowers the loading weights on the pressure regulator.

In each type pressure controller a small slow-speed, reversible, electric motor has been incorporated in the instrument and connected to the control point pointer so that on receiving an electrical impulse this motor will drive the control pointer either up or down the scale as desired. The speed of this motor has been so chosen that

the control pointer will be moved at the rate of 1 per cent of the instrument's span per second. The power supply for this small motor, 110 volts, 60 cycles, is provided at each regulator location. The impulses for actuating this motor are brought to the regulator location from the main dispatcher's office, over the telephone cable.

The actual impulse consists of a direct current impulse of low voltage, which is terminated, at the location, on the coil of a polarized relay. If a positive direct current impulse is impressed on the polarized relay, the armature of this relay will be drawn to one side and will apply 110 volts, 60 cycles to operate the small electric motor in one direction; and if a negative direct current impulse is impressed on the coil of the polarized relay, the relay armature will be drawn to the other side and will cause the small electric motor to rotate in the opposite direction.

The arrangement of the Bristol pressure controller is similar to that described in connection with the Foxboro unit except that the Bristol equipment reversible motors drive a cam, the shape of which corresponds to the rate at which pressure variations are to occur, and which cam actuates a linkage to raise or lower the regulator pressure.

On the Gas Dispatcher's desk in one of the illustrations is located a turret panel on which are mounted a series of telephone-type key switches, one key switch for each regulator location. When the key switch handle is in the center position it is in the off position, when the key is pressed to the upper position the proper impulse is transmitted to the regulator so that the output pressure of the regulator is raised. Depressing the key to the lower position transmits the proper impulse for lowering the gas pressure.

By holding the key in either of the operating positions for a certain number of seconds and observing outlet pressure recording instrument on the gauge board, the dispatcher is able to tell how much he has raised or lowered the pressure.

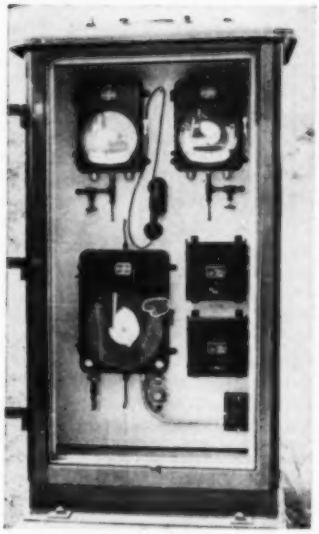
Check Points

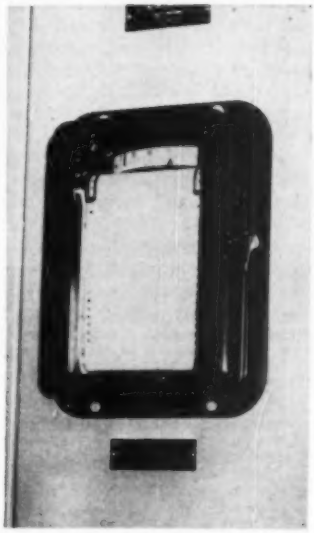
The locating of check-points has proven very satisfactory and they have justified their installation. Prior to their establishment it was necessary to maintain higher pressures than required to hold the pressure at the farthest point, there being no way to determine low pressure conditions in the area without spot checking or customer complaints.

With the check-point pressures telemetered to the Gas Dispatcher's office it is possible to adjust the pressure at the regulator by remote control during peak hours to maintain required pressure at the end of the line and to reduce such pressure at off-peak hours. In this way it is possible to reduce unaccountable gas by carrying these lower pressures at times when higher pressures are not necessary, and in so doing we are able to maintain required pressure by being able to anticipate demand.

INSTRUMENTS AND CIRCUITS PROVIDE THE MEANS WHEREBY THE GAS DISPATCHER CAN INCREASE OR REDUCE THE EFFECTIVE WEIGHTS ON REMOTELY LOCATED REGULATORS LIKE THE ONE SHOWN HERE.

CHECK-POINT INSTALLATIONS CONSIST OF A PRESSURE TRANSMITTER, CONTAINED IN A WEATHERPROOF BOX, AND ARE SO DESIGNED THAT THEY MAY BE MOVED READILY TO NEW LOCATIONS.





THE REGULATOR INSTALLATION SHOWN AT LEFT IS ENCLOSED IN A WEATHERPROOF HOUSING AND INCLUDES THE CONTROLLER, TRANSMITTERS, POWER-PACK, AND TELEPHONE. THE PRESSURE RECORDER SHOWN AT RIGHT IS LOCATED ON THE DISPATCHER'S BOARD AND RECEIVES ITS READING FROM THE CONTROL OVER WIRE.

also a wind indicator, thermometer, barometer, and a dewpoint indicator, which are located on the roof of the Service Building. Recording receivers for these instruments are provided on the gauge board.

The Gas Dispatching Department has a two-way radio, up-to-the-minute records and maps, and a lighted board containing valve and regulator locations as shown at the left in the first illustration. Direct phones connect Gas Plant, Texas Gas Transmission Company, Dispatcher at the City Gate, and Field Operations office. A teletype installation for weather information is also provided.

Our experience so far with telemetering and controls has proven most satisfactory, and with the completion of our overall plan, plus contemplated valve control, our Distribution System should function to the best interest of the people of Memphis. Good customer service is always a large dividend payer.

In our system, we have at present, fifteen (15) check-point installations now in operation with fifteen (15) others being installed with an ultimate of six (6) additional scattered strategically throughout the city as mentioned. Our check-point installation consists of a pressure transmitter contained in a weatherproof metal box, which in turn is attached to a pre-cast concrete post and located near a power source, so constructed, that they can be moved to other localities with very little trouble.

The moving of these check-points is occasioned by improvements made in the area, correcting pressure trouble with line-ties, larger mains, moving district regulators, etc. When this occurs we then move the installation to some other area selected, in which we may anticipate pressure variation and to serve as a check for a district regulator.

Full Information

There is now telemetered to the Gas Dispatching Department the height of a three million cu ft gas holder located approximately three miles distant at the Gas Plant; and

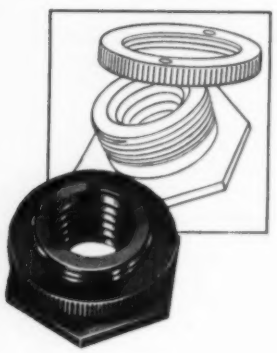
Tube Mill of A. O. Smith Corporation—Houston

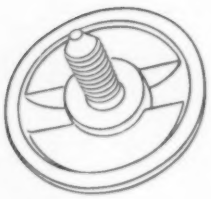
Here is the 600 ft x 200 ft main mill building of the $5 million plant of the **A. O. Smith Corporation of Texas** located in the Houston ship channel industrial area. Forty foot lengths of 30-in. diameter welded steel pipe are shown at the end of the production line.

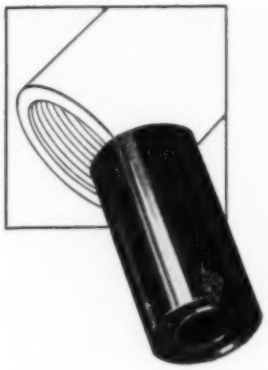
Steel from which the pipe is fabricated is manufactured by Sheffield Steel Corporation from iron ore from East Texas, limestone from Central Texas, Oklahoma coal, Texas natural gas and scrap largely purchased in the Gulf Coast region.

A. O. Smith Corporation of Milwaukee and Sheffield Steel Corporation, a subsidiary of Armco Steel Corp., are joint owners of the new pipe mill built and equipped by **The Austin Company.**

Plant is equipped at present to make pipe in sizes from 16 to 36-in. Additional facilities to be added later will broaden its size range from 8⅝ to 36-in. Scheduled for future construction are casing facilities, which will be operated in conjunction with the pipe mill.







METAL INSERT, MOLDED IN PRECISE POSITION, ASSURES DEPENDABILITY IN THE OPERATION OF THIS STEAM PRESSURE RELEASE KNOB.

INTERNAL AND EXTERNAL THREADS MOLDED INTO THE BUSHING AT THE LEFT CALL FOR THE MOST EXACTING MOLD MAKING. ADDITIONAL MACHINING IS UNNECESSARY. HIGH SPEED FINISHING OF THE COMPRESSION MOLDED PIECE AT THE RIGHT IS ACCOMPLISHED BY A MACHINE WHICH HANDLES FOUR FINISHING JOBS IN ONE OPERATION.

The Case for Plastics in Industry

To fully utilize the versatility of these synthetics, a need must be identified by someone familiar with the functional requirements of a given part. This will invariably originate within the industry using the part, not from an outside source.

INDUSTRY must continually strive to improve its product and produce it at a lower cost. Progress toward either of these goals is most easily made by sacrificing the other. In most cases a compromise is established if the gain is greater than the loss. Occasionally a step may be taken which presents both improvement and economy.

Plastics have served both interests in many industrial applications. Greater safety, better insulation, longer wear, reduced weight, corrosion resistance, etc., have been attained, often at a lower cost per unit, by the intelligent use of plastic materials.

For example, a Houston manufacturer was having difficulty with his metal gland packings on slush pumps. The metal packings corroded, due to the slightly alkaline condition of the mud. But he believes he may have found the solution to his problem through the plastic parts we made for him. We may have solved still another manufacturer's headache with plastic agitators for washing machines. And we are making complete housings for the Rutherford Duplicator, produced by a well known Houston firm.

For still another company which sells electrical parts, we plan to mold a complete electrical unit for hookups off the terminal board.

By

Carl Eckenrod

Plastics Division Superintendent
Wright Manufacturing Company
Houston, Texas

Carl Eckenrod, one of the leading plastics experts in the Southwest, started in on the ground floor of the plastics industry "boom" which began during World War II.

His first position was assistant to the manager of Taylor Manufacturing Company's new plastics division. This company, forerunner of the present day Wright Manufacturing Company, produced wiring connectors for military aircraft, electric switches, boxes, and controls.

Mr. Eckenrod and his engineering staff also developed a heat resistant material to be used as a welding rod holder. Employing an asbestos filler, the material was found to have high impact strength and excellent heat resistance.

When the Taylor Manufacturing Company became the Wright Manufacturing Company, Mr. Eckenrod came to Houston as superintendent of the plastics division.

In still another operation we expect to mold complete switch housings with modeling inserts, for dispensing gas automatically.

The tendency of people to "let well enough alone" is probably the greatest limitation confronting plastics. It is hardly the lack of variety of plastic materials, which are ever-expanding, and being made commercially available. It is not primarily the methods and techniques of processing, continually being developed and modified to meet the challenge of new applications. It is largely the inertia, the doubt, even the prejudice on the part of potentially satisfied users which inhibits the expansion of plastics applications in industry.

TYPICAL PLASTIC PARTS PRODUCED BY WRIGHT MANUFACTURING COMPANY. FIFTEEN BRASS INSERTS WERE MOLDED INTO THE AUTOMATIC GAS CONTROL SWITCH BODY SHOWN AT THE LEFT. A PUMP PACKING SUPPORT IS SHOWN AT THE RIGHT.

Versatile Synthetics

The plastics family is one of the most varied and versatile, as well as one of the newest of industrial materials. They may be conveniently divided into thermoplastic (heat softened) and thermosetting (heat hardened) materials.

Thermoplastics are formed or molded by the application of heat and/or pressure without changing the chemical structure of the material, analogous to melting and pouring paraffin into the top of a jar and then letting it cool to become solid paraffin again.

Injection molding is a complex, but highly efficient process commonly used to convert thermoplastics to desired forms by softening materials with heat, forcing it into molds and cooling it to a rigid state. Coil forms for the electrical industry, bobbins for the textile industry, and battery cases for the aircraft industry are illustrations of injection molded plastic parts, which offer superior performance at lower cost.

Thermoplastics are readily extruded, or forced through an orifice in a softened state in the form of rods, tubes, ribbons and wire coatings. Rod stock is used extensively for fabrication of furniture and decorative display work; tubing in handling chemicals that will corrode most metals.

Very large parts of rather simple design are commonly formed from large sheets of thermoplastic material with comparatively little heat and pressure. Airplane enclosures are almost universally produced in this manner, and a safer, lighter, more economical product is the result.

Solutions of thermoplastics may be used for coating, casting or cementing if the product requires it, leaving a dry, solid material upon evaporation of the solvent. Weather-resistant coatings for metal bodies, especially armaments, fabricated furniture, sheets and films for packaging have been made available by use of the solubility of plastic. These methods, obviously over-simplified in this description, are the basic processes used to convert prepared thermoplastic materials into useful shapes.

"Heat softening" is about the only common characteristic of this highly diversified group of thermoplastics, and there is even a considerable range in the temperatures at which different materials will soften. There is a complete range of properties, surface hardness, flexibility, optical clarity, electrical insulation value, chemical resistance, etc., to be found among various materials.

Thermosetting Plastics

Thermosetting, or heat hardening, plastics undergo a chemical change upon being subjected to varying degrees of heat and/or pressure, and remain an infusible, insoluble form for all practical purposes. Compression molding is probably the oldest, yet most widely used, method of forming and

CLAYTON JOUTRAW, FOREMAN OF THE MOLDING DEPARTMENT FOR WRIGHT MANUFACTURING COMPANY IN HOUSTON IS HOLDING A SET OF PREFORMS WHICH WILL BE PLACED IN THE TRANSFER MOLD.

setting these materials. Molding material is confined between the mated halves of a heated mold until the change or "cure" is effected. Parts ranging in size or function, from a tiny spacer weighing one-tenth of a gram, to a floor model television cabinet of 35 lbs are compression molded.

Large laminated sheets are produced by compressing layers of paper, wood, fabric, or other material between heated platens. Thermosetting resins are generally used to bond the layers and provide a glossy, non-porous surface. Tabletops, boat hulls, and decorative panels illustrate the various ways in which these large sheets can be used. Heavy cotton fabrics impregnated and laminated with phenolic resins are used extensively to form rods, tubes and sheets from which gears of all sizes, cams, rings, and spacers are machined.

Transfer molding is a process by which the molding material is loaded into a central well or pot,

Wright's New Houston, Texas, Plant

The Wright Manufacturing Company, originally located in Milwaukee and Racine, Wisconsin, moved into their new $3,000,000, 130,000 sq ft Houston, Texas, plant in August, 1949.

The plant was designed primarily for the purpose of producing rubber tile. Although the production of two hardnesses of rubber tile takes up the greater portion of the plant, the company also produces molded rubber products and custom-molded plastic products for industrial use.

Thomas F. Millane is now president of Wright, and B. R. Scheff is general sales manager.

and by the application of heat and pressure made semi-fluid and forced to flow through runners into a number of closed cavities. The transfer or flow of material must be completed in a relatively short time before the material begins to set or "cure". Parts with metal inserts, such as the telephone receiver or parts with delicate projections on the mold surface, are usually transfer molded because of the softened state of the material as it flows into the mold.

Thermosetting resins, both dry and liquid, are handled in many other ways. When an active catalyst is used to speed the chemical change, lesser amounts of heat or pressure are necessary. While there is not as wide a variety of thermosetting resins with the marked differences of thermoplastics, the physical properties of any one material can be greatly modified by the type of filler used with the resin. For example, phenol-formaldehyde resin may be combined with wood flour for general purpose use; with asbestos for heat resistance; chopped canvas or glass fibers for impact strength; or powdered mica for dielectric strength.

Characteristics

There can be no one ideal material which possesses all properties in exactly the right degree. The various combinations of different materials make possible the selection of a specialty in the large group of plastic materials to best serve the specific requirements of a given application. These material characteristics are needed and desired by many industries.

Generalizations about a subject as broad and varied as plastics will not stand close scrutiny, but certain characteristics are common to most types. They have a low specific gravity, a high strength-weight ratio, have good heat and electrical insulation value, good resistance to corrosion and do not absorb moisture readily. They present a smooth, lustrous surface with a fair degree of hardness and are pleasant to look at and touch.

Application

Of greater importance to industry than the traits which plastics have in common, are the diverse combinations of characteristics available, which make plastics an excellent "custom building" material. To fully utilize the versatility of plastics, a need must be recognized and identified by someone thoroughly familiar with the functional requirements of a given part or unit.

Obviously, this will almost invariably originate within the industry which will use the part, not from an outside source which is unfamiliar with the operational details of that industry. The basic requirements of the part must then be clearly conveyed to the plastic engineer or designer in order to enable him to recommend the material, design and method of fabrication. In many cases, these recommendations can be field-tested by use of sample parts, fabricated from stock materials or a sample mold, before any large investment is made in permanent molds or other production tools. Up to this point, the investment has been small, but a far greater effort is necessary to make a critical examination of one's own materials, parts or units and then view, without bias, the relation of plastics to them.

The case is not to be decided by a romantic vision of plastics as the answer to all industrial needs, or by prejudiced denunciation of plastics as a group.

Plastics have a place in each industry. That place must be determined by the cooperative effort of people in that industry, who know what they want, and the people in the plastics field who know how to make what they want. It requires an objective attitude, an open exchange of facts and considerable resourcefulness on the part of both manufacturers and merchandisers in order to determine, in each instance, whether plastics can be of service.

Our personal experience as custom-molders of thermosetting materials in our Milwaukee, Wisconsin plant was centered largely on industrial applications for midwest manufacturers.

Some of these problems required experiment and development before the desired results were obtained, such as a thrust bearing for operation under water and a fiber glass reinforced insulating cover for electrode holders.

We know southern manufacturers will be using increasing quantities of plastic parts in today's highly competitive market, and are prepared to bring together the ideas, men and equipment which are necessary to develop and produce these products for more extensive use by southern industry.

Ingalls Launches New Barge at Decatur, Alabama

Built by the **Ingalls Shipbuilding Corporation** at the Decatur, Alabama, shipyard, this new grain barge slips down the ways. Barge, 195 ft long, 35 ft wide and 11 ft in depth, was built for the Arrow Transportation Company.

THE MARSH STEEL CORP. PLANT AT NORTH KANSAS CITY, MO. ALTHOUGH THE CONCERN IS ONLY A LITTLE OVER FIVE YEARS OLD, 1947-48, EXPANSION INCLUDED THIS THREE-ACRE PLANT. THE BUILDINGS SHOWN HERE COVER THREE OF THE FIRMS 10 ACRES AT THIS SITE

Cards and Cameras Cut Costs for Missouri Metal Goods Distributor

A "Bookless Bookkeeping" procedure is cutting costs and time for the Marsh Steel Corporation, and is providing management information on a moment's notice

REPLACING the traditional work tools of the bookkeeper and the credit manager with a camera and panels of Visible Index cards, the Marsh Steel Corporation, North Kansas City, Missouri, distributors of carbon and alloy steel and aluminum products, have pioneered an accounts receivable procedure. The results, according to the company's management, have been striking and are far more advantageous than had been anticipated.

Changing from methods that followed traditional lines—and involved all the tedious posting and copying delays involved in recapitulations, multiplicity of operations and duplication of paper work—they now have an ever-active record of customer payment performance and an always-clear picture of all monies due. And they have it all with a minimum of clerical work, with unusual assurance of accuracy and at costs that are a fraction of those formerly involved in their invoicing and collection activities.

When executives of Marsh steel decided they wanted a day-to-day **simplified** picture of this important phase of finances, the accounting division took a very literal view and, with the aid of Remington Rand systems and methods technicians, decided on a camera-and-card-panel combination that provided all the answers—and actual pictures, too.

Taking Recaps by Camera

To achieve the desired combination of active and static records, the Marsh procedure employs a handful of small panels, die-cut I. V. I. (index visible) cards and a Dexigraph (prism lens) photocopying camera. The accounts receivable situation at any given moment is presented by means of the constantly changing card-and-panel record. The camera serves to take off periodic "recaps", credit department records, and posting data for the cash receipt and other ledgers.

The company has its plant and main offices in North Kansas City, Missouri, and has district sales offices in Colorado, Nebraska, Kansas, Oklahoma and Texas.

Detailing the procedure, from the point of order writing and invoicing activity in the North Kansas City office, to the uses in several departments and control activities of the finished "photographic bookkeeping" panel reproductions, the Marsh Steel Corp. comptroller, Lee O. Higdon, has this to say:

"Our order writing and billing procedure is handled by direct **ditto** process. All of our invoice copies for distribution to our customers and throughout our organization (for which eight copies are required) are run off from a master copy on the **ditto** machine. In addition, we run off analysis slips that are used in perpetual inventory control and in the preparation of statistical reports of sales activity by products and sales territories.

Preparing the Basic Record

"As a final run from the master before removing it from the machine, two I. V. I. die-cut cards are run, to pick up the customer's name, the invoice date and number, and the amount of the invoice. This is run on a single line along the top edge of the card, in the order named. These two I. V. I. cards also show all the other information on the invoice heading, such as the terms of sale, the routing of shipment, the f.o.b. terms and

whether the shipment went prepaid, collect, etc.

"The two cards with the **dittoed** information printed on them are forwarded to the accounts receivable section. There they are separated by the accounts receivable clerks in two groups. One group is designated the alphabetic copy, and the other is designated the numerical copy of accounts receivable. The groups are totaled for the day and balanced back to the total billings for the day as compiled by the bookkeeping section.

"The numerical copies of the I. V. I. cards for the billings for each day are posted by inserting them in numeric sequence by invoice numbers on the special panels adapted to receiving these cards. In filing the cards on the numerical panels there is a break made between months, and each group for its respective month bears the title of the month for which the separation has been made. With the filing of new billings in this manner and the removal of items paid, as will be explained here later, the resulting file of cards represents an **age listing** of our accounts receivable by months in chronological order and by invoice numbers in consecutive order number, from our oldest open item to our most current open item.

"Control tapes are maintained on each panel, and as new items are added to the numerical file, or as items are removed with the receipt of payments, these control tapes are changed and the sum total of the control tapes is our total outstanding accounts receivable at any given time.

"The control total on the numerical panels must equal the control totals on the alphabetical panels, and these in turn must balance to the general ledger control.

"At the end of each month the panels of the I. V. I. cards representing open items in numerical sequence are photographed with our Dexigraph machine after the panels have been balanced to the control. These photographs result in an **aged list** of our accounts receivable. Inasmuch as this control is maintained daily it is, of course, possible to have an age list of accounts receivable, almost upon a moment's notice."

The Photocopying Procedure

The handling of the alphabetic set of cards and panels, and the photographic activity which follows in that phase of Marsh operations is described by Comptroller Higdon this way:

"The second set of I. V. I. cards is first sorted in alphabetic order and then posted to another group of panels in alphabetical order and by invoice number and date under the respective customer's name. Two blank cards are inserted on the panels between different customers' names, in order to make the required break for easy identification.

"As new bills are posted to a panel, the control tapes for that panel are changed to include the new billing and the sum total of the control tapes of the panels are balanced back to the numerical control panels and to the general ledger control of accounts receivable. With the posting of the current billings daily to a customer's account and the removal of the paid items daily, the alphabetical panel always represents the current standing of the customer's account, with the open items only.

"The alphabetical panels are photographed on the 15th and the last day of each month, which are the dates on which we send out statements on our accounts receivables. The resulting photographs represent exact reproduction of the items on which statements have been forwarded to customers, and these Dexigraph prints can be referred to, should communication develop between ourselves and a customer on any of the items covered in his statement for that period.

"This photocopying procedure is necessary, due to the fact that there may be some changes in the records of the panels subsequent to forwarding the statements, because of new billings or of payments received.

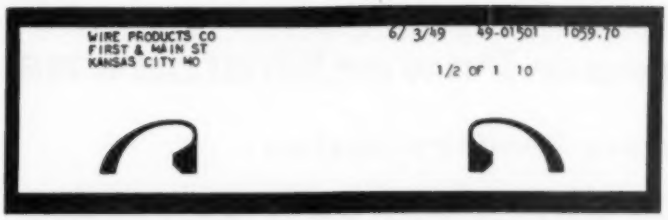
"These photographs are also used by our credit section in posting a credit card which we maintain for each of our customers.

MARSH STEEL CORP. COMPTROLLER LEE HIGDON AND HIS SECRETARY CHECK SOME ACCOUNTS RECEIVABLE ON A VISIBLE INDEX PANEL WITH PHOTO-BILLS.

Photo Records of Payments

"As checks are received from our customers in payment of their accounts, these checks are set up alphabetically daily and the corresponding I. V. I. card for the invoice being paid is removed from the alphabetic accounts receivable control panel and placed, in the order of their removal, on a special set of panels.

"As each card is removed from the alphabetical accounts receivable panel it is stamped **paid.** If any discount is taken by the customer in payment of his account, this discount is shown in a designated position on the I. V. I. card for each item being paid. This



CLOSE-UP OF A TYPICAL VISIBLE INDEX (I. V. I.) CARD READY FOR INSERTION IN AN ACCOUNTS RECIVABLE PANEL FOR PHOTOCOPYING. THE BLACK "COLLARS" IN THE LOWER PORTION ARE THE SLOTS BY WHICH INDIVIDUAL CARDS ARE HELD IN PLACE ON THE PANELS.

filing of the paid cards on the special panels results in a listing (again in alphabetical order by consecutive invoice number and chronological date) of all of the items paid on a given date. Photographs are taken on the Dexigraph of the panels of cards representing items paid each day. These photographs represent the supporting detail for posting to our cash receipts journal of the credit to accounts receivable, the debit to discounts allowed and debit to our bank account.

"A regular deposit slip is typed up of the checks deposited that day, in alphabetical order by customer. The deposit slip shows the bank transit number of the customer's check and the amount of the check. It is thus very simple to associate the net amount of the check deposited with the group of items being paid by that particular check, as represented by the photograph of the items paid that day on the special card panels.

"After the photographs have been taken of the items paid each day, the I. V. I. cards are removed from the special panels and placed in filing drawers in alphabetical order by customer's name and by consecutive order number of invoice numbers and chronological order by date.

Microfilm Is Used Too

"These cards are accumulated in the file for one year; then are photographed on microfilm with the Remington Rand Film-a-record system. The yearly film records of the paid accounts receivable cards represent a ready reference file of our customer history of total purchases. These files are referred to, both by the sales department and by the credit and collection sections.

Results in Savings

By way of comment on the foregoing outline of our procedures, I would like to say that I believe it can readily be recognized that the alphabetical accounts receivable panels represent a very important tool to the credit and collection department as a ready reference to maintain any customer's account within the credit limits established for him. The total open items are instantly available, as well as the current status of the account with reference to old, unpaid items."

From the standpoint of the staff the new procedure has involved little or no difficulty, and except for simple darkroom developing of the panel prints there have been no practices or routines requiring special skills or training. The Dexigraph camera is a point-of-use piece of equipment and can be moved and operated without special hook-ups or attachments, anywhere in the company's offices. Light-tight transfer boxes make removal of the exposed paper easy, and the developing process is speedy and inexpensive.

Although Marsh executives feel the primary value of the new procedure is in the ease of handling and the constancy with which the accounts receivable picture is always available, there are definite financial as well as time savings to be noted. Just what these will amount to will not be known until such time as detailed cost studies have been instituted.

How To Decrease Power Shutdowns

Distribution System Modernization Affords Increased Power Reliability

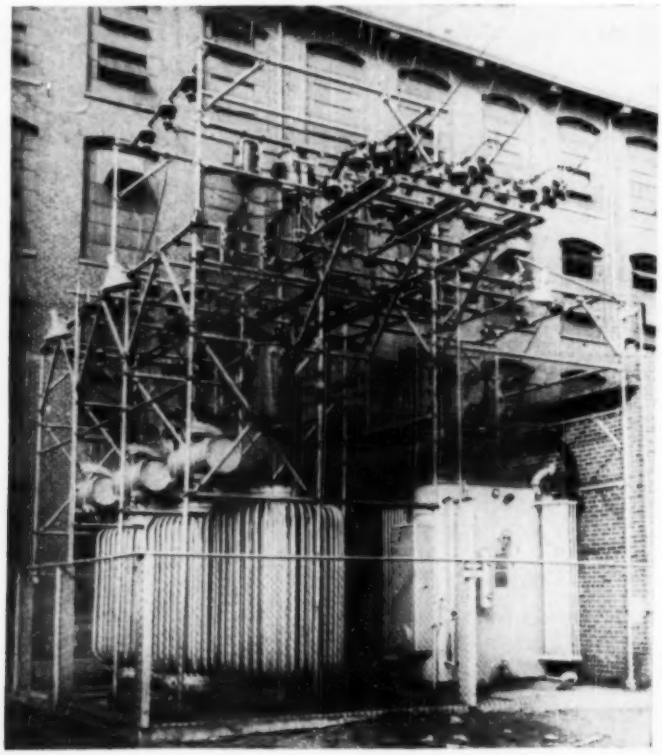
Add up the score for modernization . . . fewer outages, better production, and reduced maintenance. See also the item "Card Game" on page 49

By
Robert J. Tucker, Jr.
Plant Engineer
Roanoke Mills Company
Roanoke Rapids, N. C.

DO you have production losses during the year because of failures of your own power equipment? What is the condition of your major equipment and cable feeders? Outages do occur sooner or later, particularly as the equipment increases in age. It only takes a small item such as a cracked bushing, loose connection in a junction box or the substation, lightning damage, a carelessly thrown rock or piece of wire to cause a shutdown. Of course, overloaded transformers and circuit breakers, particularly if advanced in age, are natural booby traps set to explode just when production means the most.

What protection should we have against such production losses? Preventive maintenance is, of course, the best solution. But we engineers and management officials are too quick to pass along to the Master Mechanic a demand for complete preventive maintenance without providing him the tools and facilities necessary. In the case of transformers, substations and switchboards the proper tools and methods at best are not absolute insurance against production losses. Why not then assume that some such outages will occur sooner or later and provide alternate power connections that would minimize the losses for critical processes and departments.

TRANSFORMER SUBSTATION SHOWING NEW THREE-PHASE UNIT IN FOREGROUND.



Of course many companies carry insurance against loss of profits in case of such failures. Most failures, however, are cleared and production resumed before such policies take effect. In any event, payments of such claims don't compensate for lost wages of the workers nor the shock to the morale and efficiency of a plant due to a prolonged shutdown. Most serious failures invariably lead to injury of one or more valuable employees —a matter never wholly compensated for by insurance payments. Let's prevent these shutdowns therefore so that productivity will remain high.

Provision of modern adequate equipment is of primary importance. Transformers, switchboards and power feeders cannot operate forever under present conditions of rising production with consequent rise in power consumption. A switchboard, for instance, that had adequate capacity 20

years ago to interrupt severe short circuits may no longer be safe. Its operating parts have aged and worn, reducing their effectiveness. More important, the capacity of the Public Utility system serving your plant has grown immensely during those 20 years. This means that short circuit currents in your mill will be much more destructive. This is a phenomenon not widely publicized or understood until recent years when plant electrical loads and Utility generating capacities reached new peaks making the problem much more serious.

Management cannot be expected to produce out of thin air with little or no notice the necessary funds to modernize electrical equipment. Such programs are usually quite expensive and are best tied into over-all plant modernization or expansion plans. It is a wise engineer, master mechanic or chief electrician, however, who makes his plans ahead and knows what he wants before management is ready to act.

The Problem

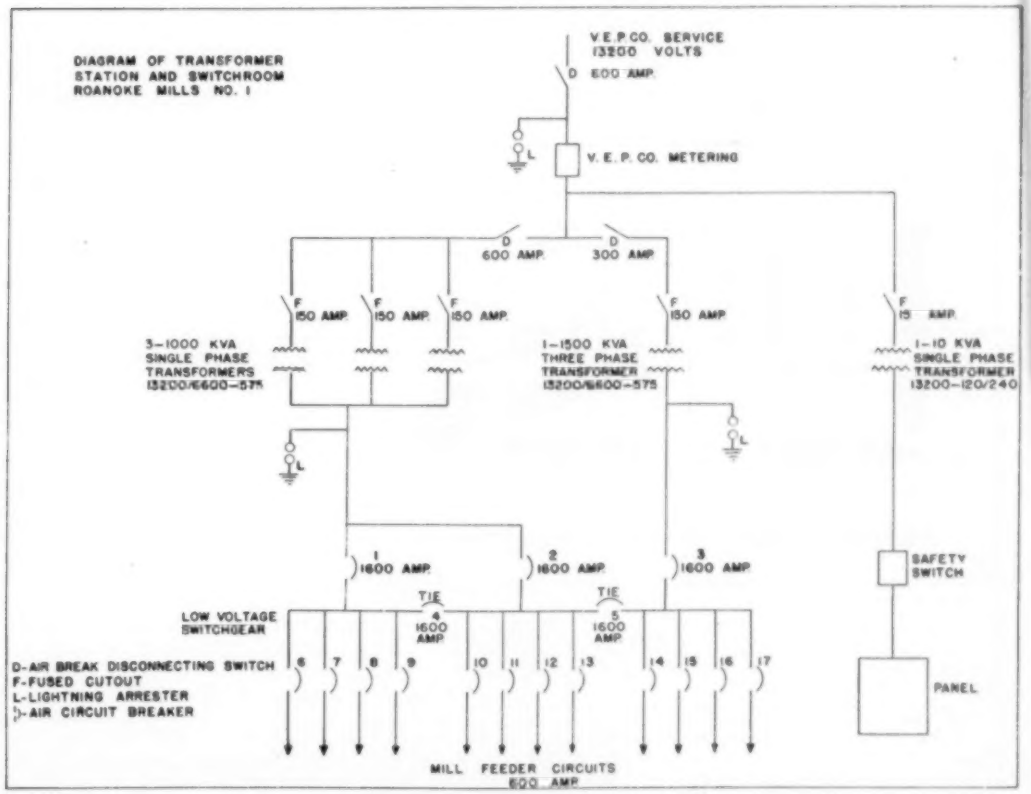
Roanoke Mills Company No. 1 Mill, Roanoke Rapids, N. C., has recently completed modernization of its primary power equipment which provides one practical application of the points brought out above. When electrified in 1927 the plant was served by a single bank of three 1000 kva single phase transformers rated at 13,200/6600-575 volts. Power was fed through a main oil circuit breaker to a 7 circuit oil breaker switchboard and then into the mill. The individual circuit breakers were rated to break 15,000 amps short circuit current and were adequate as long as the main breaker interrupted higher short circuit currents first.

By 1949 the plant load had grown to 3180 kva or a 6 per cent overload. It was most desirable to reduce the load on the then 22 year old transformers and to allow removal of the cores and windings for inspection and cleaning. Growth of the Utility's generating capacity and the mill's connected motor load over the years had raised the possible short circuit currents to 80,000 amps which far surpassed the 15,000 amp rating of the 22 year old circuit breakers. Two breakers had been added to the board to allow for additional circuits. A third additional breaker was badly needed.

New Transformer

Backed by an understanding progressive management, the solution of this situation was an engineer's dream. The accompanying one-line diagram shows the new arrangement of equipment. A new Pennsylvania 1500 kva three phase transformer was installed to raise

DIAGRAM OF TRANSFORMER STATION AND POWER DISTRIBUTION CIRCUITS.



the transformer capacity. It adds enough capacity to allow removal of any one of the power transformers from service without adverse effect on plant production. In fact as soon as the new transformer was placed on the line, the old 100 kva units were removed one at a time and shipped to the Electric Motor Repair Company, Raleigh, N. C., for complete overhaul. The choice of a three phase transformer was based on limited available space, a much lower installation cost and the adjoining 3000 kva bank which can absorb its load in case of failure. This additional transformer removed the inherent danger of the previous single transformer bank.

Switchgear

The heart of the whole system is the new General Electric air circuit breaker switchgear. Note that the board is divided into three sections, each having one main breaker and four feeder circuit breakers. Tie breakers between the three sections allow transfer of part or all of the mill electrical load from one transformer bank to another within one minute. This feature has been used many times already to allow routine maintenance and testing of the transformers and substation equipment without a lengthy power interruption.

Looking into the future, it is planned to replace the original 1000 kva units some day with two 1500 kva three phase units, each serving one section of the switchgear. Then the inherent danger of severe short circuit currents from the 3000 kva bank will have been eliminated by reducing the maximum unit capacity to 1500 kva.

Within the switchgear all circuit breakers are of the draw-out or "filing cabinet" type. Spare units on hand allow rapid replacement of a defective breaker without delay for repairs. Each feeder breaker is equipped with reverse time delay undervoltage devices which minimize production losses due to momentary fluctuations of the voltage due to lightning or other primary system disturbances. The old switchboard would shut down the entire mill for several minutes because of the slightest line fluctuation.

Each feeder is equipped with plug-in test jacks to allow power factor and voltage tests in addition to triplex ammeters which indicate the circuit load continuously. Ground test lamps are provided ahead of each main breaker. Grounded motors and cables are thus found promptly before serious damage occurs. Each main breaker is also equipped with a voltmeter, triplex ammeter, wattmeter and power factor meter, thus allowing a continuous check on growth of the electrical loads.

Not shown on the diagram are several interconnections between critical feeders out in the plant. These take the form of safety switches or fuse blocks which, if closed, will allow both feeders to be supplied from either of two switchgear sections. The result is a continued power supply in case of a main feeder failure. Of course use of such facilities is carefully supervised by the chief electrician.

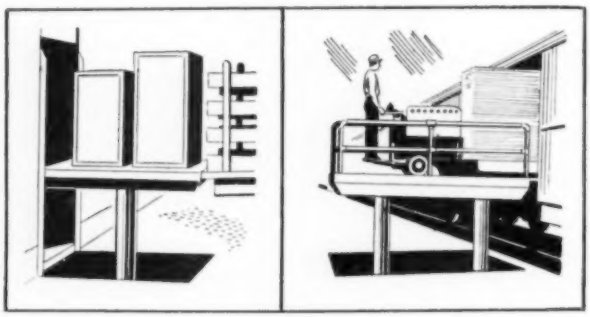
We are now installing a double throw safety switch ahead of one particularly important elevator to allow its operation from either of two feeders.

Better Maintenance

The above features should lead to better care and maintenance of the primary power transformers, switchgear and feeders. A scheduled system of maintenance and records is employed to insure this.

Recently our system faced a sudden acid test. Routine oil tests revealed that two 1000 kva units had dropped from 27,000 volts test to 12,000 volts test in six months. In a matter of minutes the mill was operating on the 1500 kva unit and maintenance crews were at work. Luckily the mill was not operating at full capacity. No production was lost.

How different the story would have been without the new units. A complete shut-down or risk of permanent damage to the two transformers would have been faced. Two days time was required to filter the transformer oil and check all sealing gaskets, and it might have taken longer. Without the new transformer and the interconnected switchgear the outage would have been serious. But as it was, production hummed along because we had provided needed facilities. That's what we mean by Better Production by Increased Power Reliability.



Shipping Speeded by Levelators

Examples of savings effected by Levelators, manufactured by Rotary Lift Company of Memphis, Tennessee, are illustrated in the accompanying diagrams.

The General Electric Supply Company of Memphis, Tenn., uses a Levelator to rapidly handle refrigerators, wire reels, motors, etc. They say it not only cuts handling costs but is far safer than the former method of using skids.

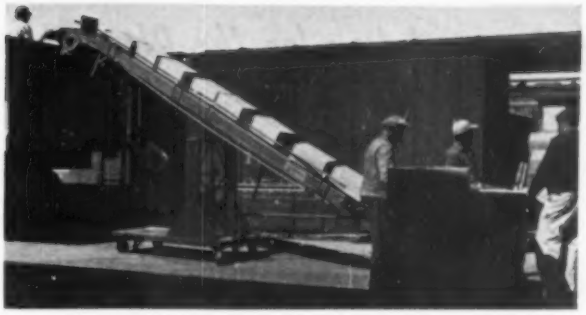
E. L. Bruce Company, Memphis, Tenn., leading floor manufacturers, use seven Levelators in their various plants. A throw-over bridge speeds up loading from the Levelator platform to railroad cars.

50% Saving in Loading Time

A 50 PER CENT saving in loading time is reported by the Pasco Packing Company of Dade City, Florida, as a result of changed handling methods. This firm, which processes citrus fruits, operates a fleet of 110 semi-trailers to move case goods from its plant. Output of up to 100,000 cases per day over a 10-month season makes fast, efficient handling imperative.

Formerly a 6-man crew was required to load a single trailer. Cases were moved into the trailer on gravity conveyor, requiring removal of the endgate during loading operations. Sides of trailer then had a tendency to spread, making replacement of end gate a time-consuming job.

The new loading method employs portable power belt units and gravity conveyors, manufactured by the Rapids-Standard Co., which elevate the 50-pound cartons from the loading dock over the side of the trailer. An average of 30 cars or trailers, with a capacity of 2000 cases per car or 800 cases per trailer are now shipped daily by using seven Rapistan Rapid Power Booster power belt conveyors. A four-man handling crew places the cartons on the belt of the Booster and stacks them in the trailer . . . saving approximately 80 man-hours daily over previous 6-man method. Men formerly in the loading crews have been placed in the production jobs in the plant, increasing output without adding to the total payroll.

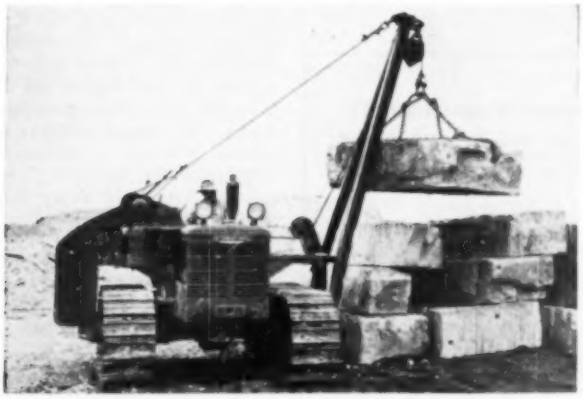


AT THE PASCO PACKING COMPANY, A RAPID POWER BOOSTER IS WHEELED TO END OF THE TRAILER, AND CASES ARE TRANSFERRED FROM PALLETS TO THE BELT UNIT. GRAVITY CONVEYOR CONNECTED TO THE HEAD OF THE BOOSTER FLOWS THE CASES DIRECTLY TO THE STACKERS IN THE TRAILER. END GATE DOES NOT HAVE TO BE REMOVED AND REPLACED SAVING APPROXIMATELY 50 MAN-HOURS DAILY ON THE 50-LOAD AVERAGE SHIPMENT. IN ADDITION, THE SMALLER LOADING CREW IS ABLE TO HANDLE A LARGER VOLUME THAN WAS POSSIBLE WITH THE PREVIOUS METHOD.

Pipeboom Tractor Slashes Stone Firm's Quarrying Costs

A new method of handling mill blocks in a quarry, which saves thousands of dollars in equipment and operating costs, has been demonstrated by Joseph J. Kell of Lueders, Texas. Kell, owner of West Texas Stone Company, cut that firm's expenses drastically by using an International TD-14 diesel crawler tractor equipped with a Superior sideboom, to move block.

AN INTERNATIONAL TD-14 DIESEL CRAWLER TRACTOR, EQUIPPED WITH A SUPERIOR SIDEBOOM TO MOVE BLOCK, OPERATES AT THE WEST TEXAS STONE COMPANY AT LUEDERS, TEXAS.



This unique application of a pipeliners' "boom tractor" made it possible for West Texas Stone company to eliminate stationary hoists and derricks in its quarry. The tractor picks up limestone cut from the shelf and "walks" the blocks across the excavation, depositing them on stockpiles or waiting trucks.

After buying the TD-14, which he says paid for itself in three months, Kell sold approximately $20,000 worth of stationary equipment he no longer needed. His 25-man working force was reduced to four men, since it was not necessary to have crews to operate and maintain hoists and derricks.

Production at the quarry rose 80 per cent. Formerly, 25 men and six hoists and six derricks produced a maximum 10 blocks a day. Now, four men and the TD-14 average 18 blocks daily, and have turned out as many as 25. Blocks average 3'6"x7'6"x20" in size, and 5,500 lb in weight.

Instrumentation for the Plant Engineer

Measurement and Control of

By E. A. Murphy Brown Instruments Division, Minneapolis-Honeywell Regulator Co.

SP&I is presenting this series on instrumentation to help plant and production engineers work out their process control problems. Rather basic in nature, the articles deal with variables commonly encountered in the plant and outline the principal means available for measurement and control.

THE thermocouple is probably the most widely used of the various electrical temperature sensing elements. It consists of two lengths of dissimilar metals welded together at one end. The welded end—known as the hot junction—is exposed to the temperature to be measured; the free or unwelded end—known as the cold junction—is connected to the instrument by means of suitable electrical conductors. When a temperature gradient exists between the hot and cold junctions, a small electromotive force is generated, the value of the emf depending on the materials used and the size of the temperature gradient.

This generation of emf by a thermocouple as explained by Seebeck is attributable to two effects. One, the Peltier effect, which is directly responsible for the emf transmitted to the measuring instrument, is derived from the fact that two dissimilar wires are welded together at one end and that there exists a temperature difference between the free and the welded ends. It is the Thompson effect, however, which makes a thermocouple practical for industrial use. This effect states that the emf generated by a thermocouple depends upon a temperature gradient along each thermocouple wire. This makes it possible to measure true hot junction temperature even though the thermocouple may have to be installed so that the temperature at some point along its length is above that of the hot junction.

Many Types Available

Although it is quite true that any two dissimilar metals can be used to make a thermocouple, metals selected for use in the manufacture of thermocouples for industrial and commercial use are chosen because they possess certain qualifications.

The ability to resist oxidation and reduction is of particular importance since the action of oxidizing and reducing agents is accelerated at elevated temperatures.

Ability to develop a fairly large emf is a desirable feature because it means that relatively small changes in the temperature of the hot junction will result in the generation of an emf strong enough to actuate the measuring instrument.

Uniform temperature-emf relationship is advantageous in that it makes possible an evenly or uniformly graduated instrument chart and scale resulting in good readability throughout the entire range of the instrument.

Cost is a factor because every thermocouple has some finite life and will eventually have to be replaced.

Reproducibility—i.e., the ability to produce subsequent lots of wire having identical thermoelectric properties—is a matter of extreme importance, and makes the thermocouple a practical tool for industry. If reproducibility were lacking, it would be necessary to recalibrate the indicating or recording instrument every time a thermocouple was replaced.

Type T Thermocouples for Low Temperature Work

Although the thermocouple is usually associated with the measurement of high temperatures, the Type T couple, made of copper and

What is Electrical Temperature Measurement?

Heat manifests itself by marked changes in the physical state of the body heated. Among these changes are the following seven upon which are based the operation of most industrial temperature measuring instruments:

1. Increase in dimensions
2. Increase in pressure
3. Change in state
4. Change in color
5. Thermoelectric effect
6. Change in electrical resistance
7. Change in radiant energy emitted

Electrical temperature measurement concerns itself largely with the last four. Basically, electric temperature measurement is any type of measurement wherein the sensing element detects temperature changes and translates these changes into electrical impulses which are transmitted to a receiving instrument.

Process Variables - Part 2

Thermocouples

Part I in the September issue of SP&I covered basic operating principles and factors to be considered in the selection of pressure type thermometers. This Part 2 discusses thermocouples—types available, installational data, maintenance, importance of the extension wire, and advantages and limitations.

constantan, is practical for measuring temperatures well below zero. One typical temperature range is —350 to —100 F.

Type J Thermocouple Used in Reducing Atmospheres

This couple, fabricated from iron and constantan, is particularly successful in withstanding the effects of **reducing** atmospheres. Although it can be used at higher temperatures, the maximum recommended temperature for greatest thermocouple life under continuous operation is approximately 1400 F.

Type K Thermocouple Resists Oxidation

When an oxidizing atmosphere is present, the Type K couple consisting of nickel-chromium and nickel-aluminum alloys is recommended. Maximum efficient operating temperature for continuous use is in the neighborhood of 1900 F.

Types R and S for Higher Temperatures

These couples, fabricated of platinum and platinum-rhodium, are used for higher temperatures ranging up to 3000 F. They are commonly referred to as "noble metal" couples and are highly resistant to either an oxidizing or a reducing atmosphere. They should **not**, however, be used on applications where the atmosphere will be alternately oxidizing and reducing. The Type R couple contains a slightly higher percentage of rhodium and develops a higher emf for a given temperature rise.

Installation of Thermocouples

Because of their relatively small mass, it is often possible to install thermocouples in locations where a thermometer bulb would not fit. In general, however, the same precautions must be observed as when installing thermometer bulbs. They should be kept away from steam coils and burner flames, not so much because of any damage which may result, but because, unless such precautions are taken they will then measure the temperature of the coils or flames rather than representative temperature of the baths or furnaces in which they are installed.

As illustrated, the couple itself is usually covered by a protecting tube or well. This tube may be of metal or of some ceramic material. In either case, it is advisable to mount the element where it will not be damaged by moving parts of the process equipment or by work which may be moving through a continuous furnace. It should be mounted firmly with proper support, and should not be subjected to severe jarring or vibration. The head, or place where the couple is connected to the electrical conductors leading to the instrument, should be protected from the weather. Since the temperature measured by a thermocouple is that existing at the tip or hot junction, care should be taken to insert the tip well into the space where measurement is desired.

Maintenance

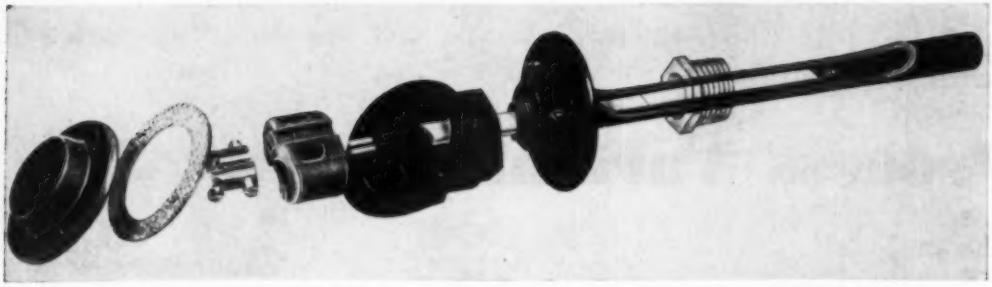
Over an extended period of operation at high temperatures, a certain amount of deterioration takes place in any thermocouple. In the case of Types J and R, this deterioration is usually manifested by a gradual decrease in the emf out-

Electrical Temperature Sensing Elements

A temperature sensing element is that part of a complete measuring system which is exposed directly to the temperature being measured. In the case of the pressure-type thermometer discussed in the September issue of SP&I, the bulb proper comprised the temperature sensing element.

Unlike thermometer bulbs, however, electrical temperature sensing elements are not integral parts of the complete measuring systems. Since they are connected to the indicating or recording instruments by means of flexible electrical conductors, they can easily be removed or replaced.

Moreover, any one element can be employed with several different kinds of instruments. For this reason, the various sensing elements will be discussed separately. The instruments with which they can be used will be covered later.



EXPLODED VIEW OF TYPICAL INDUSTRIAL THERMOCOUPLE ASSEMBLY SHOWING FROM LEFT TO RIGHT: COVER FOR THERMOCOUPLE HEAD; GASKET; TERMINAL WHERE THERMOCOUPLE ELEMENT CONNECTS TO EXTENSION WIRE; TERMINAL BLOCK; THERMOCOUPLE HEAD SHOWING COLD JUNCTION END OF THERMOCOUPLE ELEMENT; ADJUSTABLE MOUNTING FLANGE; INSULATORS PROTECTING THERMOCOUPLE WIRES INSIDE PROTECTIVE TUBE; STEEL BUSHING; HOT JUNCTION OF THERMOCOUPLE; AND END OF PROTECTIVE TUBE.

put. There are available tables which show the correct millivolt outputs for different temperatures for all types of thermocouples in industrial use. Thermocouples should be checked periodically to make sure they are generating the correct emfs. As soon as this emf starts to fall off, it is advisable to replace the couple.

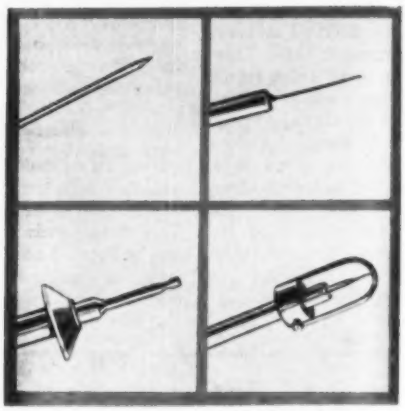
When deterioration sets in with the Type K couple, the result is sometimes an increase over the rated emf for a given temperature. Although it is sometimes possible to increase the useful life of this couple by removing the hot junction plus about an inch of the wires immediately above it and rewelding the tip forming a new hot junction, it is usually economically advisable to replace the entire couple.

Extension Wire Important Part of Measuring System

Although not an integral part of the thermocouple, the extension wire—conductors which connect the couple to the instrument—is an essential part of the measuring system. Since the emf generated by a thermocouple depends on the temperature difference between the hot junction and the cold junction, extension wire is made of the same materials used in the thermocouple itself or of materials having the same thermoelectric properties. This effectively extends the cold junction to the instrument proper where some provision can be made to automatically correct for temperature variations within the instrument case.

If some other materials were used for the extension wire, the cold junction would remain at the thermocouple head, and since the extension wire and thermocouple wire would be joined together there, the point of connection would in effect comprise a sort of secondary thermocouple. The net result would be completely erratic temperature readings every time the temperature changed; (1) at the thermocouple head, or (2) at the instrument.

Readings would be erratic for the following reasons: the thermocouple itself would generate an emf varying in amount with the temperature gradient between the hot junction and the cold junction (in this case the binding posts in the thermocouple head). Consequently this emf will be changed if either the temperature at the hot junction or that at the cold junction should change. The extension wires come into close contact with the thermocouple wires in the thermocouple head, and since they do not have identical



Typical Thermocouple Designs

Top Left: Special sanitary pointed thermocouple designed for measuring internal temperature of meat during processing.

Top Right: Thermocouple for measuring temperature of milk on receiving deck of dairy plant.

Bottom Left: Sanitary thermocouple for use where mounting or insertion space is limited.

Bottom Right: Thermocouple used for measuring temperature in candy kettles. Note guard to prevent sensitive tip from contacting heated kettle wall.

thermoelectric properties, a temperature gradient between the instrument case and the thermocouple head will set up another emf which may either buck or add to the other emf in the system.

Extension Wires Must Be Connected Properly

It is not enough merely to make sure that the proper type extension wire is used with a given type thermocouple. A thermocouple is composed of a positive and a negative wire and produces a d-c voltage. When the extension wires are connected to the thermocouple, care must be taken to connect the positive extension wire to the positive thermocouple wire. Reversing these wires will cause serious errors in temperature measurement. Similar precautions must be taken in connecting the extension wires to the instrument binding posts. Binding posts in the thermocouple head and in the instrument are marked with + and — signs, and extension wires are color coded as to polarity. Lacking a color identification table, it is usually safe for the operator to assume that the red wire is the negative one.

Plant maintenance personnel should always check extension wire connections if the instrument reads erratically as many needless calls for service engineers have been made as the result of crossed or reversed extension wires.

Maintenance of Extension Wires

Although extension wires, being flexible electrical conductors, are quite resistant to damage, they should be given the same care and protection as any other electrical conductors. Trouble sometimes occurs at points where moisture or condensate may be trapped and soak through the insulation—where wires run over steam pipes, or where very high temperatures prevail.

Poorly soldered joints and splices introduce additional circuit resistance, and since the wires carry an extremely low voltage, incorrect instrument operation often results. This situation is further aggravated when vibration is present since the combination is responsible for a continually fluctuating circuit resistance.

Advantages and Limitations

Thermocouples possess many advantages as temperature measuring elements. In the first place, they are not integral parts of the measuring system. They are relatively inexpensive and can be quickly and easily replaced when necessary. Their small mass makes them very sensitive to temperature changes, and offers additional benefits where mounting space is at a premium. They are available in many forms and sizes and can be designed to suit highly specialized applications. When employed with a multirecord instrument, they make it possible to record on one chart a large number of temperatures measured at different locations. Extension wire is inexpensive, a factor which makes it economically feasible to mount the recording or indicating instrument an appreciable distance from the point of measurement.

Higher initial expense of the instruments used with thermocouples is sometimes mentioned as a limitation. While this may be true in cases where the instrument can be installed at or very close to the point of measurement, and where continuous troublefree operation is not essential, the many advantages of thermocouples more often outweigh this limitation.

Possibly the only real limitation of thermocouples is in the measure of very small temperature spans, i.e., where there is only a span of thirty or forty degrees between the minimum and maximum ranges of an instrument. The reason for this is that the emf generated by a thermocouple over such a span is so small that temperature changes within the span would cause changes in emf so minute that they would not be reflected in the measuring instrument. In other words, the sensitivity of the instrument, or its ability to respond to e x t r e m e l y small temperature changes would be affected. This is especially true in the low temperature ranges where the emf output of a thermocouple is relatively small. Although there are in existence thermocouple actuated measuring systems covering smaller temperature spans, it is generally inadvisable to employ this form of measurement where a total span of less than 100 F is involved and where sensitivity and accuracy are critical factors.

Part 3 of Measurement and Control of Process Variables to be published in SP&I will discuss electrical temperature sensing elements other than thermocouples.

Transportation for "Visiting Firemen"

A new passenger version of the Yale "Freightmaster"—a battery-powered load carrier—is specially designed to carry comfortably around the plant six distinguished visitors, stockholders, "open-house" guests, or just the boss' friends, saving valuable time and energy.

Since industrial plants involve thousands of feet of aisle space, this new intra-plant carrier promises to transform what was once a peripatetic ordeal into a pleasurable jaunt.

Humidity Control Problem Solved for Hosiery Plant in Tennessee

By Milton C. May

Dehumidifier units tied into existing air conditioning system of the Charles H. Bacon Co., Loudon, Tennessee, provide comfort air conditioning—better control of production operations.

THE installation of "Kathabar" dehumidifier units at the full fashioned hosiery division of the Charles H. Bacon Co., Loudon, Tennessee eliminated serious production problems caused by excessive relative humidity, running as high as 70 per cent in the summer months.

Engineering Problem

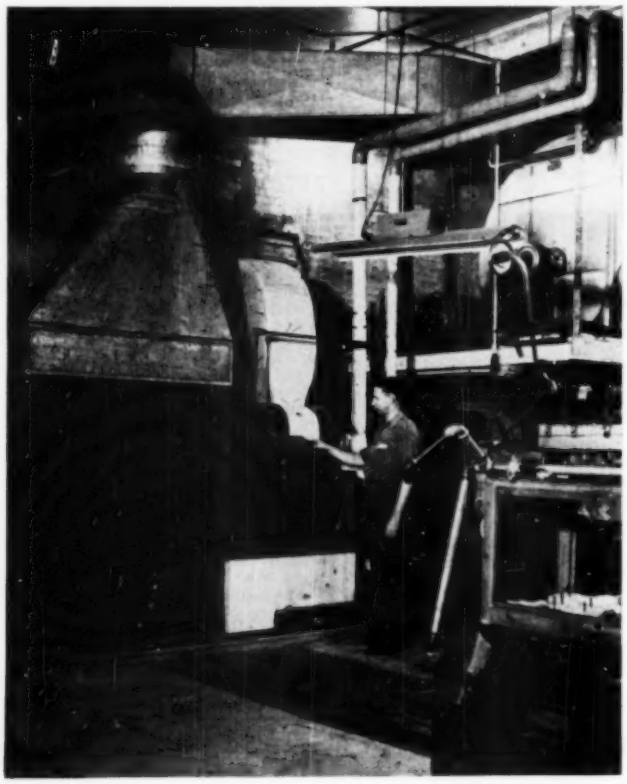
Plant engineers were confronted with two problems: to reduce the moisture content of the air to prevent size from stripping off of the nylon yarn and to mantain constant conditions to aid in controlling the length of stockings produced in this mill.

Close Control Necessary

Production operations of this nature demand close control of humidity and temperature. Excessive humidity allows nylon to stretch. Adjustments on full-fashioned machines are fine, and any change of more than three to four degrees adversely affects operation of the entire unit. Machines function better and make better quality hose if the temperature is maintained constant.

Equipment Installation

Better production in this mill was afforded by the installation of three "Kathabar" dehumidifiers in the two buildings housing the full-fashioned equipment. Kathabar dehumidifiers, a product of the Surface Combustion Corporation of



ONE OF THE "KATHABAR" DEHUMIDIFIER UNITS TIED INTO THE AIR CONDITIONING SYSTEM OF THE CHARLES H. BACON CO., LOUDON, TENNESSEE. DEHUMIDIFIER CHAMBER IS SHOWN AT THE LEFT; MAN IS STANDING BY AIR-INTAKE. FAN IN BACK END OF UNIT DRAWS DEHUMIDIFIED AIR UP THROUGH DUCT AT TOP AND BLOWS IT INTO THE CENTRAL STATION SPRAYING CHAMBER WHERE THE DESIRED AMOUNT OF HUMIDITY IS ADDED. UNIT IS NEEDED ONLY WHEN AN EXCESSIVE AMOUNT OF MOISTURE IS PRESENT. CONDITIONED AIR IS HANDLED BY THE AIR CONDITIONING SYSTEM AFTER THE DEHUMIDIFIER SERVES ITS PURPOSE.

Toledo, Ohio, offer a chemical means of dehumidification.

Very satisfactory results are being obtained at the Loudon plant by using these chemical units in combination with refrigeration to maintain any desired relationship between humidity and temperature control. The liquid chemical, lithium chloride, will treat large quantities of air at reasonable cost and the temperature of the air leaving the lithium chloride unit is approximately the same as the air entering.

Air is taken into the unit through an individual duct from outside the building. Raw air is passed through a filter to remove foreign particles. Filtered air enters a nozzle equipped chamber where it is sprayed with Kathene, the lithium chloride compound which removes the moisture from the air.

A coil element is located in the lower part of the spraying chamber. Coils are cooled by water passing through them, and the chemical spray is cooled as it falls on the coils. Amount of moisture removed from the air, passing through the chamber, depends on the temperature of the chemical compound, which in turn is controlled by the volume of cold water passing through the coil element. Flow of water through the coil is controlled by a regulator which is tied in with an adjusting mechanism located in the knitting room.

Chemical Re-used

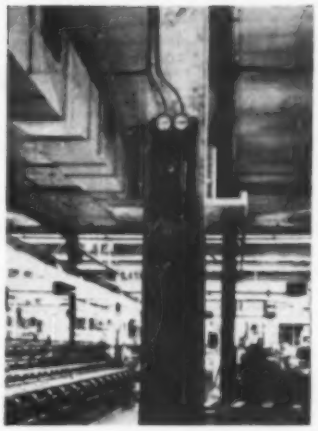
When water accumulates in the absorbing chemical, the compound is circulated through another compartment where steam coils remove the excess. When the liquid level rises in the reservoir, a mercury switch is activated, thereby releasing steam into the coils. A fan in this chamber blows the moisture through a duct which runs to the outside of the building.

Low Operating and Maintenance Cost

The combination chemical and refrigeration installation gives great flexibility for unusual conditions, either outside or inside. The separate control of humidity and temperature makes the equipment independent of any unusual relationship which might exist between the latent and sensible heat, either in the outside air or conditioned space.

Maintenance on the combination installation is less because of the lower connected horsepower and because of the ease with which the refrigeration and the chemical dehumidifier are able to take care of their respective duties.

HYGROSTAT FOR CONTROLLING THE AMOUNT OF MOISTURE TAKEN OUT OF THE AIR BY DEHUMIDIFIER. A KEY IS USED TO REGULATE THIS INSTRUMENT WHICH SELDOM REQUIRES ADJUSTMENT ONCE IT IS SET CORRECTLY. LOCATED ON THE SAME POST BEHIND THE HYGROSTAT IS AN INSTRUMENT FOR RECORDING THE TEMPERATURE AND RELATIVE HUMIDITY.



New Wiring Development

Displayed at the recent meeting of the Engineering and Operation Section of the Southeastern Electric Exchange in Atlanta, Georgia, the new development is a self-contained wiring system including conductors, insulation, and a flexible seamless copper outer tube for protection. The material, designated as MI Safety Wiring is manufactured by the Safety Mineral Insulated Wire Div., General Cable Corporation, of Perth Amboy, N. J.

Design Features

The letters MI stand for mineral insulation and this is one of the distinctive features of the cable. The insulation is magnesium oxide which is dense, tightly compacted, and offers fire safety of a high degree and permits the cable to withstand high temperatures. Since the insulation is a stable mineral, it remains unchanged by temperature, loads, or time.

Production and Availability

As we understand it, the cable is manufactured by assembling the conductors, insulation, and outer tubing in their proper relationship but in large dimensions. The entire unit is then rolled and drawn down to the sizes desired, the conductors, insulation, and outer tubing all being reduced in dimension but keeping their proper, desired relationship.

At the present time, the wiring material is available in sizes ranging from single conductor No. 16 up to 7-conductor No. 4 for voltages up to 600 volts. It is suitable for power, lighting, and control circuits. It is pliable and easily worked. Simple fittings are available for terminating and attaching to outlets and fixtures.

Because it is moisture-proof, it can be installed in shallow channels in plaster and masonry. Its ability to withstand high temperatures permits effective use in many high temperature locations that have been real problems with other types of wiring materials. Also the higher temperature and better heat conducting characteristics will give the conductors a higher safe current carrying capacity rating than many other conventional wiring materials.

Although the MI Safety Wiring is available only in relatively smaller sizes, it has been manufactured in sizes up to 500,000 cir mil.

A System of Water Treatment for Boilers up to 900 Psi -- With Low Make - Up

Part 3

This 3 article series describes a successful system of treatment including operating limits and methods of control. Part 1, published in August, presented Preparation of Raw Water Make-Up and Evaporation Operation. Part 2 in the September issue of SP&I discussed Boiler Feedwater and Water in the oiler. This, Part 3, covers Chemical Analysis Correlation and Blowdown.

By Charles L. Wolff,
Plant Engineer
and
Irving Leibson,
Student Engineer
Florida Power and Light Company
Miami, Florida

THE proposed system of boiler water chemical control provides a simple means of checking the consistency and accuracy of the important daily boiler water chemical tests. The tests involved are pH, phenolphathalein alkalinity as ppm $CaCO_3$, methyl orange alkalinity as ppm $CaCO_3$, and total phosphates as ppm PO_4. Methyl orange alkalinity as reported includes the phenolphthalein alkalinity.

The approximate concentration of actual tri-sodium phosphate present in the boiler water (expressed as ppm PO_4) may be estimated by multiplying the phenolphthalein alkalinity by a factor of 1.9. The pH corresponding to this concentration of tri-sodium phosphate may be found by referring to the solid line of the phosphate-pH Coordination Curve. This calculated pH should be about 0.1 pH units higher than the measured pH and when this allowance is made, the results should agree with $\pm$ 0.1 pH units. The approximate total phosphate concentration may be estimated by multiplying the difference between the methyl orange and phenolphthalein alkalinities by a factor of 1.9. This calculated total phosphate concentration (expressed as ppm PO_4) should be about 10 ppm higher than the reported value as determined by the phosphate test. When this allowance is made, the calculated value should agree with the test value within $\pm$ 10 ppm.

The cross check calculation for pH is made possible by the fact that, within the normal operating range of total phosphate concentrations, boiler water pH is almost completely governed by tri-sodium phosphate concentration. The factor of 1.9 is necessary for the conversion of ppm $CaCO_3$ to ppm PO_4.

The theoretical basis for the total phosphate cross check calculation may be best explained by discussing in detail, the nature of the alkalinity titrations. In accordance with conventional usage in water chemistry, these tests are reported in terms of ppm $CaCO_3$. However, we are actually not titrating carbonate ions, but instead principally phosphate ions. In fact, the phenolphthalein alkalinity endpoint corresponds to a complete conversion of tri-sodium phosphate to di-sodium phosphate. The pH at this endpoint should read approximately 8.0 to 8.2.

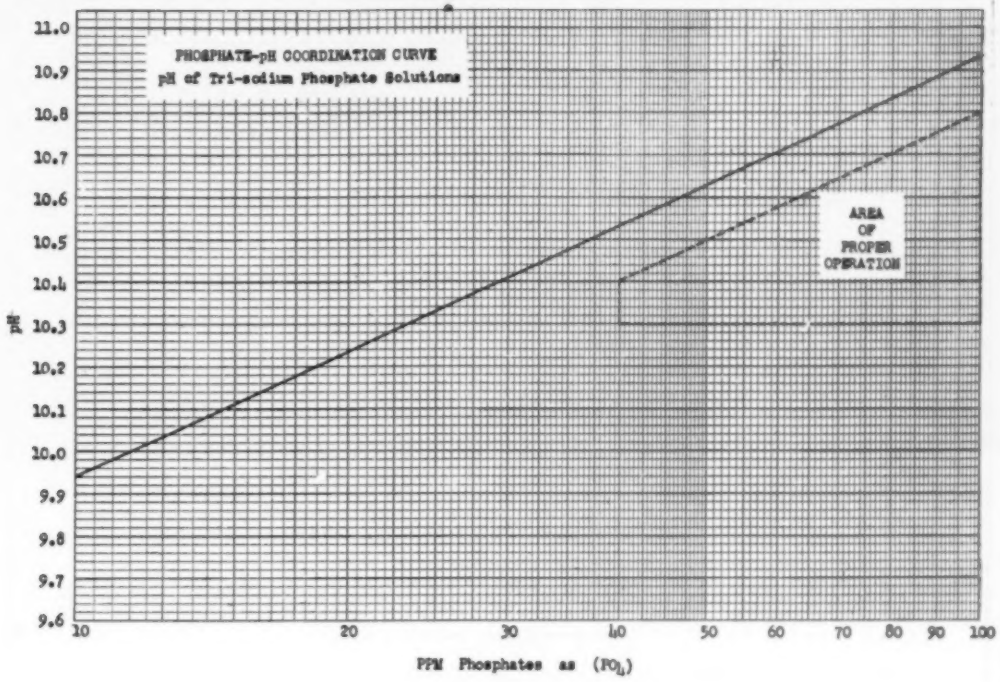
Continuing from the phenolphthalein alkalinity endpoint, the addition of acid converts di-sodium phosphate to mono-sodium phosphate. At the methyl orange alkalinity endpoint, the pH should be between 4.5 and 5.0. Calculated total phosphate concentration is approximately 10 ppm higher than the test value. This may be explained by the fact that other weak acid anions, (such as the silicate ion) react with the titrant acid in the pH range of the conversion of di-sodium phosphate to mono-sodium phosphate.

Chemical Treatment

From the foregoing, boiler water chemical control may be manipulated using the Phosphate-pH Coordination Curve to predict necessary treatment very closely for securing a desired result. If the boiler water pH is too low, the incremental concentration of tri-sodium phosphate necessary to reach the desired condition may be calculated. Similarly, if the boiler water pH is too high, it may be reduced by treatment with mono-sodium phosphate which converts tri-sodium phosphate to di-sodium phosphate.

For example, a boiler water analysis shows a pH of 10.66 and a total phosphate concentration of 65 ppm PO_4. This point lies outside the area of proper operation of The Curve. Assume that it is desired to lower the pH to 10.50. The tri-sodium phosphate concentration, found by following a line of constant pH of 10.66 to the left, is 54 ppm PO_4; the di-sodium phosphate concentration is 11 ppm (65-54). The tri-sodium phosphate concentration corresponds to the desired value of pH, 10.50, is read from the solid line as 37 ppm PO_4. Thus, the addition of 17 ppm (54-37) of mono-sodium phosphate will reduce the tri-sodium phosphate the same amount, bringing the total phosphate concentration up 17 ppm to 82 ppm and the pH down to 10.50.

The method of boiler water chemical control provides the change in concentration, for any one component, which is necessary to maintain optimum operating conditions. To determine the actual amount of any chemical required for treatment, knowledge of the water storage capacity of the boiler when on the line and steaming normally is necessary. With this information, the increase in ppm upon addition of one pound of chemical may be calculated. This calculated value should be confirmed experimentally by adding one pound of the chemical



Example of Cross Check Calculations

Consider a boiler water with the following analysis: pH 10.42, phenolphathalein alkalinity 19 ppm $CaCO_3$, methyl orange alkalinity 53 ppm $CaCO_3$, chlorides 91 ppm NaCl, sulfites 12 ppm Na_2SO_3, sulfates 118 ppm Na_2SO_4, phosphates 52 ppm PO_4, and silica 5 ppm SiO_2. The tri-sodium phosphate actually present is 19x1.9 or 36.1 ppm PO_4.

Referring to the above **Phosphate-pH Coordination Curve**, the calculated pH is 10.49, 0.07 pH units greater than the test value.

The calculated total phosphate concentration is (53-19)x1.9 or 65 ppm PO_4.

Subtracting 10 ppm from this value, the result is 55 ppm for the calculated value as compared with the test value of 52 ppm PO_4. Thus, it is possible to detect errors in daily boiler water chemical tests for pH, alkalinity, and phosphates by this method of correlation.

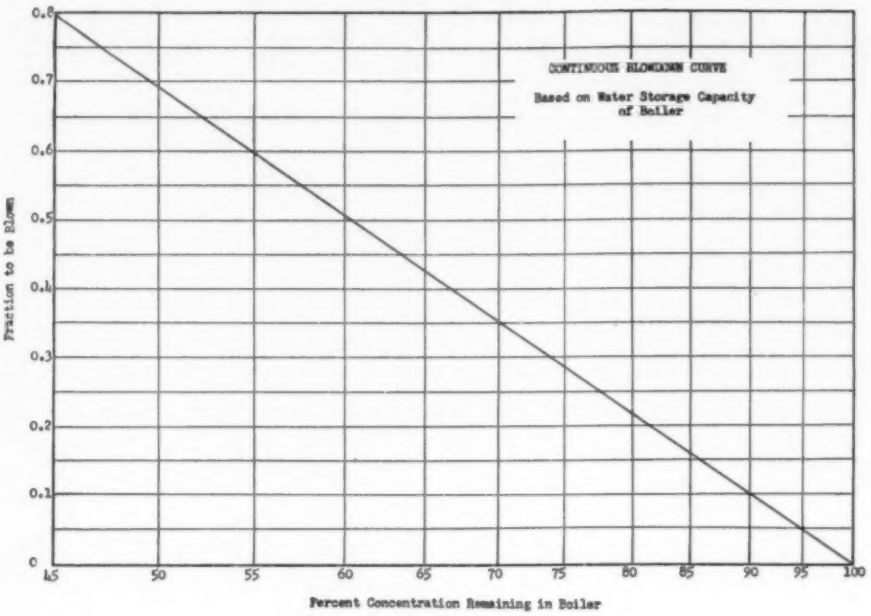
to the boiler and testing in the laboratory for the increase in concentration of the component effected.

It is sufficient to cite an example of a boiler with a 100,000 pound water storage capacity. The approximate results obtained by the addition of one pound each of the following chemicals to the boiler are: sodium sulfite (anhydrous) 10 ppm Na_2SO_3, monosodium phosphate (mono-hydrate) 7 ppm PO_4, di-sodium phosphate (anhydrous) 7 ppm PO_4, and tri-sodium phosphate (anhydrous) 6 ppm PO_4. If other forms of these chemicals than those listed above are used, proportionately larger or smaller quantities will be required to produce the same effects, depending on the weight of the water of crystallization.

Conclusion

Precise operating limits have been given in the system of treatment presented in this article dealing specifically with boilers up to 900 psi with low evaporated makeup. These operating limits have been found to insure optimum operation with a minimum of maintenance work over a period of years. We do not claim that these are the only safe limits which can be maintained. However, over a period of years, no pitting, tube failures, excessive scaling, or embrittlement has been encountered in installations where the proposed operating limits have been maintained.

Many of the ideas presented in this article are not new. It has been understood for years that it is necessary to maintain boiler water pH at a relatively high value and that the presence of a film of sodium sulfite and phosphates on the water side metal is



Boiler Blowdown

Boiler blowdown is effective in removing objectionable matter and in reducing the concentrations of any and all components when necessary. The reduction of total solids by blowdown should be followed by the addition of such chemicals as are necessary to maintain proper limits for pH, phosphate, and sodium sulfite.

The Curve presents a useful relationship between percentage of boiler capacity to be blown by continuous blowdown (based on the water storage capacity of the boiler) and per cent concentration remaining in the boiler. For example, assume that it is desired to reduce a boiler water total phosphate concentration by 20 per cent for a boiler of 100,000 lb water storage capacity (when on the line and steaming normally).

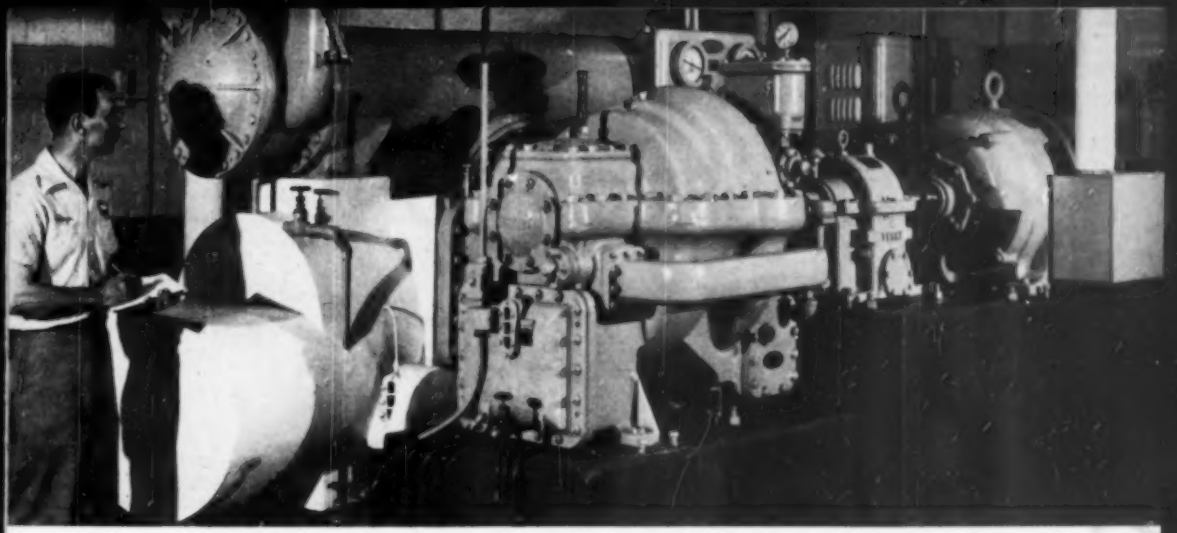
Referring to The Curve, since 80 per cent of the phosphate concentration is to remain in the boiler, 22 per cent of the water storage capacity of the boiler or 22,000 lb of water is to be blown.

The amount of time for the continuous blowdown should be fixed at that value which provides the most reasonable rate of flow in the continuous blowdown line. In this example, if the micrometer valve in the continuous blowdown line remains open for 11 hours, the rate of blowdown is 2,000 lb of water per hour. The proper micrometer valve setting to maintain this rate of blowdown may be found by consulting the manufacturer's flow chart provided for the particular valve installed.

This method of lowering boiler water concentrations may show a constant error as great as 20 per cent. However, familiarization with and continued application of this control will considerably reduce the error for a given installation.

effective in preventing corrosion. The section of this paper concerning boiler water presents a clear precise relationship between these variables and a method for manipulating treatment to maintain proper operating limits. Some liberty of language is taken in that we have spoken of sodium hydroxide and various sodium salts of phosphoric acid as being "present" in the boiler water. To clarify this oversimplification, it should be stated that these compounds are present as solids upon evaporation of the boiler water.

At boiler pressures above 900 psi, sodium salts possess a marked tendency to "hide out" due to lowered solubility under these conditions. The same basic system of treatment and control presented in this article is readily applicable to boiler water treated with potassium salts. The same Phosphate-pH Coordination Curve may be employed. However, the new factor of potassium to sodium ratio should be given due consideration.

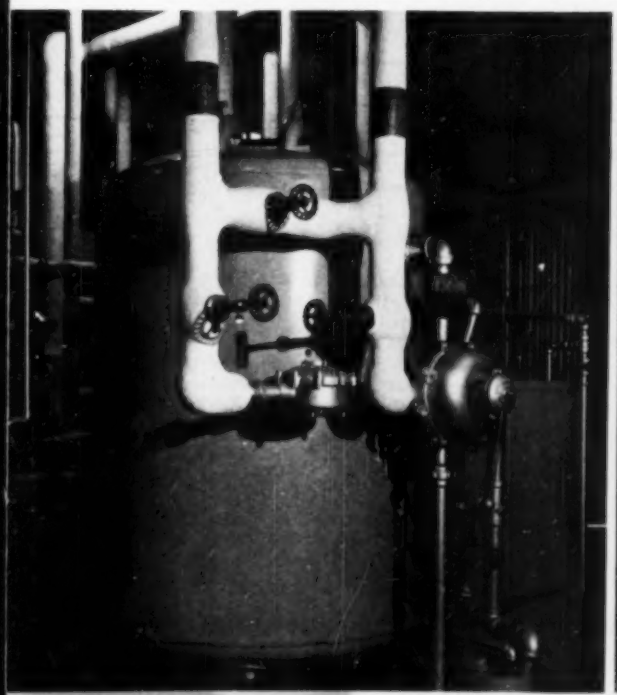


THIS 150-TON CARRIER SYSTEM FURNISHES AIR CONDITIONING FOR THE OFFICES AND FOR THE LARGE COMPOUNDING LABORATORY OF THE DR. PEPPER COMPANY'S PLANT IN DALLAS, TEXAS. IT IS SUPPLEMENTED BY ONE ADDITIONAL UNIT WHICH MAINTAINS CONTROLLED TEMPERATURES IN THE COMPANY'S LARGE STORAGE VAULT PROTECTING THE VARIOUS FLAVORING INGREDIENTS USED IN MANUFACTURE OF DR. PEPPER SYRUP.

Cleanliness in the Boiler Room

Plant sanitation is not confined to the compounding and bottling departments of this ultra-modern industrial syrup plant producing the famous 10 - 2 and 4 Dr. Pepper drink. Boilers, air conditioning units and water softening equipment are kept spotlessly clean.

THE 1,000 GAL ELGIN WATER SOFTENER AND THE TWO 235 HP KEWANEE BOILERS GIVE MUCH EVIDENCE OF HIGHLY COMMENDABLE BOILER ROOM MAINTENANCE BY PLANT ENGINEER K. S. STROUP AND HIS STAFF. BOILERS ARE EQUIPPED WITH WEBSTER ENGINEERING CO. GAS BURNERS AND MINNEAPOLIS-HONEYWELL CONTROLS.



Rx LUBRICATION

Part XVII—Oil Purification

By C. J. Copley and Will Risk

When a high quality lubricant has been correctly selected to accomplish specific results in a machine or engine, it should provide endless service in use. Theoretically, a good oil does not wear out. Yet, a good oil must be replaced periodically in order that the moving parts of any mechanism continue to receive proper protection. Such replacment is not necessarily made because that oil has "broken down" but because in performing its service it has been allowed to become overheated, contaminated and/or diluted.

It is not the purpose of this chapter of the **Lubrication Notebook** to explain how or why such undesirable action takes place nor to describe how it may be prevented. Accepting the fact that an economically worthwhile salvageable batch of lubricating oil has become overheated, contaminated and/or diluted, we are interested in what may be done to return such a batch of oil to a reasonable re-use value.

No manufacturing plant can afford to unthinkingly discard any salvageable material. No manufacturing plant utilizing machines employing circulation, bath, splash or ring oiling lubrication systems should discard the used lubricant from any of these systems without first exploring the possibilities of its re-use or, at least, its re-employment for some less important service. Even the most severely contaminated lubricant drawn from an overworked Diesel engine crankcase can find a legitimate end-use in preventing the weather-erosion of pilings, wood or metal fences, rail lubrication or even some rough forms of slushing.

The decision to attempt some form of purification (clarification, reclamation or filtration) of a used oil should be based upon four general observations:

1. The Original Value of the Oil
2. The Nature of the Contaminants
3. The Re-use Value
4. A Suitable Method of Purifying

It should be stated at once that good economy will often dictate only the use of clean fresh oil at all times in the lubricating system of precision and/or high speed equipment. This statement is later developed but for the sake of emphasis it is not to be implied that all used oil, regardless of condition, can be "re-born" to its original virginity and assured continued successful service.

THE ORIGINAL VALUE OF THE OIL

The decision to spend the time and the money to purify a lubricant is a matter of economics. Usually the lubricants employed in circulation, bath, splash or ring oiling systems are high quality oils and, as such, fall into the higher comparative brackets of original cost per gallon. It would naturally follow that lubricants employed in such services are attractive to the possibilities of purification. Certainly a high quality product, even though it will not be returned to its original service after purification (in the interest of maximum machine protection) may at least find safe application as a general purpose lubricant.

The decision to purify will also depend upon the amount of oil involved. By and large, the use of any method of purification will only prove economical providing a sufficiently attractive amount of usable product can be salvaged to justify the time and money involved. Some conditions might well eliminate any attempt to reclaim the oil in favor of using it "as is" for some minor job of lubrication.

While value per gallon and volume are important, the physical make-up of the oil being considered for purification is also an essential consideration. Today, a large percentage of lubricants contain "additives" of one sort or another, placed in the oil to accomplish some result or to strengthen some natural characteristic. Typical of some such additives are those that reduce foaming, increase

film strength, decrease oxidation, minimize corrosion, etc.

Many good lubricants contain one or more of these additives enabling the lubricant to render greater protection to the machine in which it is employed. Hence, great care should be exercised in selecting a purifying method that will reclaim such an oil **without** removing those desirable additions.

Basically, purifying methods involving chemicals or "activated-clay" will generally nullify the desired action of "additives". Consequently, queries should be made of the oil supplier to determine: **first,** if the oil contains one or more additives: **second,** what method of purification is recommended by the supplier: **third,** should such an oil be put back into its original service after such a purification method is employed.

NATURE OF THE CONTAMINANTS

It will be recognized that the different types of services in which lubricants are employed will dictate the types of contaminants most likely to find their way into the lubricating system and hence into the lubricant.

For example, the circulation system of a diesel engine is subjected to possible contamination by the products of combustion while the oil in the circulation system of a cement grinder may pick up cement dust. The lubricant in the reservoir of a splash lubricated gear set will be subjected to different operating conditions compared with that of a ring oiled bearing and hence will be subjected to different possibilities of contamination.

Contaminants are those undesired ingredients that occur or find their way into an oil, impairing its value as a lubricant. Such contaminants are usually produced by combustion while some result from the "breathing" of the system. Some are formed by chemicals or by chemical reactions. Others are the result of uncleanliness and faulty maintenance.

Outlined below are some of the more common types of contaminants and their most common source of origin:

Water
- Product of fuel combustion
- Humid surroundings
- Water using processes
- Leaking cooling systems

Soluble and Insoluble Carbon
- By product of incomplete combustion
- Oil oxidation
  - High temperatures with air
  - Presence of water
- Acid conditions

Fuel Dilution
- Incomplete combustion
- Cold engine starting

Metal Particles
- Undue wear

Dirt
- Surrounding atmosphere
- Faulty maintenance

RE-USE VALUE OF RECLAIMED OIL

Generally speaking, it is only by laboratory test that judgment may be passed upon the re-use value of a reclaimed oil. Primarily, the governing factors are the condition of the oil to be reclaimed and the service that the reclaimed oil will be called upon to render.

If the oil taken from a system is badly contaminated it stands to reason it probably cannot be brought back sufficiently to return it with confidence to perform the job for which it was originally intended. In this case it might be wiser to give it a "light" settling treatment and employ it as a general purpose lubricant. If, however, it was removed from the system because an emulsion developed (liver-like mass of an oil-water mixture) it might react satisfactorily to the Settling and Coagulation Method.

The most practical way of solving this problem of oil suitability after reclamation is to send a sample of the purified oil to the original supplier of the oil and ask for his recommendation of re-use or preferred employment.

SETTLING

Commonly called Batch Settling, it provides for a periodic removal of all insoluble impurities from the oil charge and a reduction in the soluble impurities.

The charge of oil should be completely drained from the machine immediately after shutting down, before the oil has had an opportunity to cool. It should be run into a clean empty tank of sufficient capacity to hold the entire charge.

The charge of oil just drained from the system should be allowed to settle in the tank without heating or agitation for a minimum period of about fourteen days. Water, solids and other insoluble impurities will settle out of the oil. With the decreasing temperature, some of the products of oil oxidation soluble in the oil at the temperature of operation, and insoluble at normal room temperature will be precipitated, settling in the tank.

Efficient separation of impurities during settling depends, to a large extent, on the fluidity of the oil. With a light bodied oil efficient settling is assured when the oil has a temperature of about 120 F at the beginning of the process. This is approximately the operating temperature of a light-bodied oil under normal operating conditions. If heating is required in order to bring the oil to this temperature, it should be applied slowly and be discontinued immediately when the desired temperature is reached. Efficient settling cannot be obtained while heating, due to convection currents.

The withdrawal of the clarified oil, following the settling period, must be done with care to avoid agitation of the settlings.

SETTLING OR COAGULATION

This method utilizes the batch method but in addition employs the use of an alkali to achieve a greater reduction in the soluble impurities.

The used oil is placed in a settling tank and approximately two gallons of water and five pounds of soda ash are added. The whole batch is raised to 170 F. and agitated with live steam for about an hour.

The batch is then allowed to settle until only clear oil remains on the top which is drawn off for subsequent use.

This system is not used to any great extent since considerable care is required: first, not to damage the oil by overheating or by over alkalizing: second, a careful check of the reclaimed oil must be made to be sure it is not on the alkaline side: third, approximately 10 out of every 100 gallons of the oil treated is lost: and fourth, it is a "messy" operation.

General Effectiveness of Some Methods of Purification

Type	Contaminants				Effect Upon Additives	Color Improvement	Remarks
	Water	Fuel	Solid Impurities	Oil Soluble Impurities			
Settling	X		X		None	Partial	Heating batch to 150 F to 180 F will expedite rapidity of action.
Settling and Coagulation	X		X	Some	X	Partial	Involves use of alkalis and their precision neutralization.
Plain Filter			X		None	Slight	Usually described as bag, plate, frame or edge types.
Activated Clay Filter	X	Some	X	X	X	Good	Overheating may damage the oil.
Centrifuge	X		X		None	Questionable	Best suited to continuous or by-pass operation.

Note: X indicates theoretical removals, depending upon the kind of unit employed. The systems mentioned neither evaluate the individual merits of various types or makes of equipment nor place a degree of efficiency upon their individual achievements.

FILTERS

The use of filters is perhaps the most common and adequate method of purifying oil. Many types of filters are available, the simpler being of the bag, frame, plate or edge type. The more involved utilize Fullers Earth or some form of "activated" clay as the filtering medium.

A great many lubricating systems employ the simple type filter either to by-pass part of the oil for continuous cleaning or pipe all of the circulating oil through the device (full-flow).

No problem exists in the use of such filters other than being sure the filters are periodically cleaned and the filter unit maintained in undamaged state.

The Earth-Type filters employ diatomaceous earth which will absorb oxidized hydro-carbons, remove collodial carbon and usually reduce the neutralization number of the oil. Some types affect partial removal of the fuel oil dilution. All earth filters remove part or all of the chemical additives in the oil.

CENTRIFUGE

Purification with a centrifuge is a mechanical process. Dirty oil enters a centrifuge bowl and the rate of filtration depends on the capacity of the unit. More rapid separation of insoluble impurities is possible when the oil is heated.

The disadvantages of this type of filtration lie in the fact that the electrical element can overheat the oil and it is generally a messy and dirty job to keep the centrifuge clean. It removes only insoluble impurities in the oil. This method of purification is not too effective with modern oils due to the fine dispersion of suspended matter.

The advantage of using the centrifuge lies in its excellent ability to rapidly remove water and solid and semi-solid impurities.

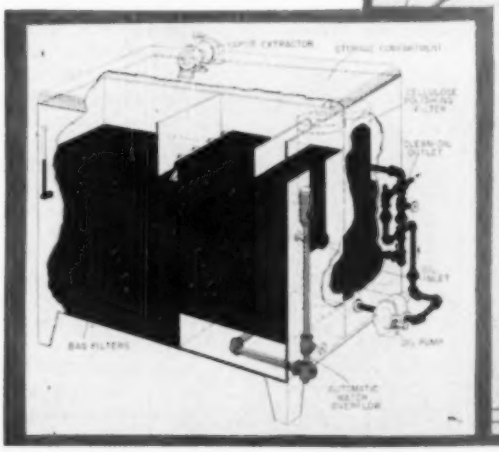
CAUTION

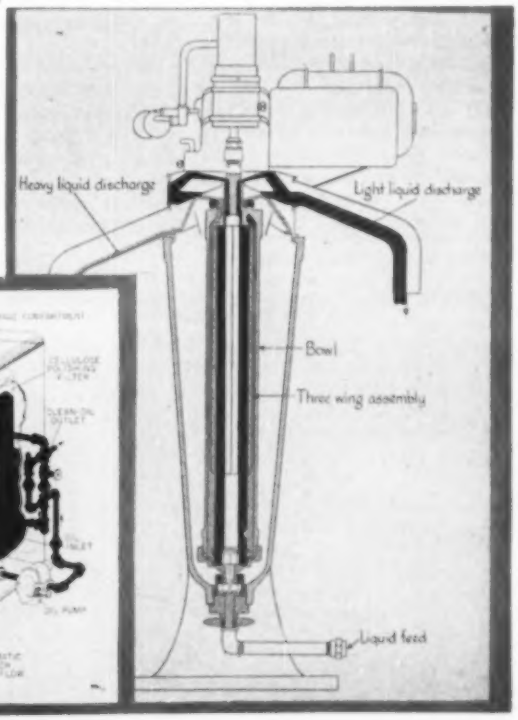
Regardless of the method, filter medium or type unit employed in the purification of any used oil, a realization of their limits must be considered. Since part of the problem may be one of chemistry, the only safe evaluation of the cleaned oil is that of laboratory analysis.

It is only good practice to consult the oil supplier in deciding:

1. To purify or not to purify.
2. The method to use.
3. The value of the reclaimed lubricant.

THE BOWSER DRY-TYPE OIL CONDITIONER, SHOWN BELOW, HAS THREE SEPARATE ELEMENTS: SETTLING TRAYS FOR WATER REMOVAL, PRIMARY BAG FILTERS AND SECONDARY POLISHING FILTERS. THE TUBULAR TYPE OF CENTRIFUGE IS EXEMPLIFIED BY THE SHARPLES MACHINE, SHOWN AT THE RIGHT IN SECTION. IN DIESEL ENGINE WORK, "LIGHT" LIQUID IS CLEAN LUBRICANT; "HEAVY" LIQUID, WATER.





Helping the MAN-IN-THE-PLANT

Readers are invited to send in kinks, ideas, and suggestions. Payment is made for all material accepted.

Slasher Output Increased 50% by Instrumentation

AMONG the many processes placed under automatic control during modernization at the Startex mill, Startex, S. C., one that highlighted the program was the instrumentation of three West Point Foundry and Machine Co., cotton slashers. To increase production, the slashers were converted from two- to three-cylinder units and instrumentation was added. An immediate throughput increase of 50 per cent was realized.

Although a third cylinder definitely provided increased machine capacity, some very important results were observed.

(1) After 10 months operation, instruments chart records revealed a lower steam consumption. The increased production with lowered steam usage resulted in considerable dollar savings.

(2) Operating steam pressures have been reduced.

(3) The Brown electronic Moist-O-Graph pneumatic controller operating in a cascade system produces control at constant speed. This is a very important feature for estimating slasher capacities as they affect attendant operations. Constant speeds are also desirable from the maintenance point of view since machinery, and particularly drive equipment, show less wear when not subjected to cyclic or constantly changing speeds.

The constant speed control system is a combination known to the instrument industry as cascade control. Instead of the final controlled variable (moisture regain) being used directly to regulate cylinder temperature, it is employed to re-position the set point of a steam pressure controller. Thus, the cylinder temperature control set point is trimmed enough to maintain a new drying rate in relation to product demand.

The Brown electronic Moist-O-Graph controller functions to detect moisture content of the sized warp as shown in the schematic

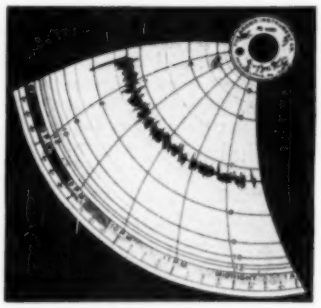
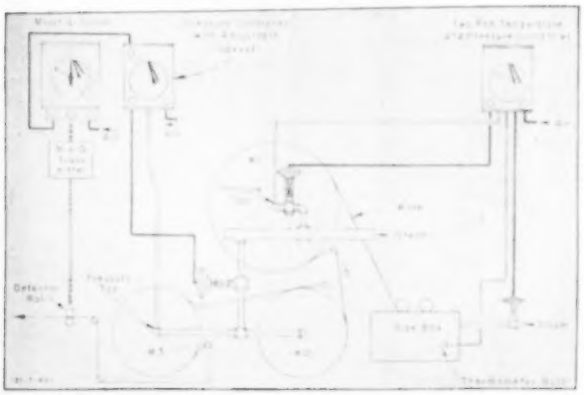


diagram. With its sensitive bridge circuit, it rapidly detects moisture change and pneumatically transmits its instructions to the temperature controller when an unfavorable balance exists between heat applied to the cylinders and heat carried away in the drying process.

As shown in the diagram, a two-pen duplex controller is used for maintaining size box temperature and No. 1 cylinder pressure. The secondary controller is a single-pen pressure gauge controlling cylinders Nos. 2 and 3 which have a common steam manifold.

As evidenced by the accompanying chart section, the constant speed control system is capable of maintaining regain values within very narrow limits. This particular chart section is from an actual production record obtained at the Startex Mills. It shows variations in moisture regain being held within $\pm\frac{1}{8}$ of one per cent.

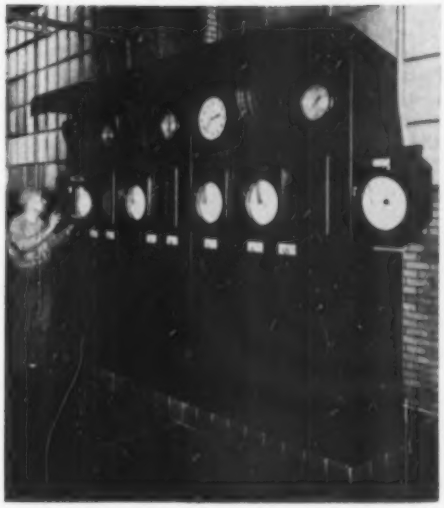
CONSTANT-SPEED MOIST-O-GRAPH CONTROL SYSTEM FOR THREE-CYLINDER COTTON SLASHER.



Improved Capacity and Process Steam Control

By T. Y. Lovern
Chief Operating Engineer
Virginia Branch, American Tobacco Co.
Richmond, Va.

The problem was solved so effectively that instead of adding a boiler, two boilers are now doing the work that three couldn't handle.



INSTRUMENT PANEL OF THE HAYS AUTOMATIC COMBUSTION CONTROL SYSTEM.

WHEN the demand for steam exceeded our boiler plant capacity, either a new boiler had to be added, or the three already in service had to be reconditioned to increase their steam generating capacity. There was also a second consideration. In addition to the increased demand for steam, our manufacturing plant called for better process load regulation.

Our boilers supply power and process steam to the factory that produces Lucky Strike cigarettes. The drying and other processes which go into the making of cigarettes require particularly close regulation of the steam used in manufacturing.

The problem, then, involved (1) increase of capacity, and (2) better regulation of the process steam.

The decision was made to recondition our existing boilers and to install the Hays Combustion Control System.

Boiler Changes

There were several steps in the reconditioning of the three Edgemoor bent-tube boilers in the plant. The refractory fire brick was removed, increasing the grate area in each unit from 95 sq ft to 106 sq ft. Water walls were added side, front, and rear, and the Taylor multiple retort stoker serving each boiler was enlarged from 4 retorts to 5 retorts.

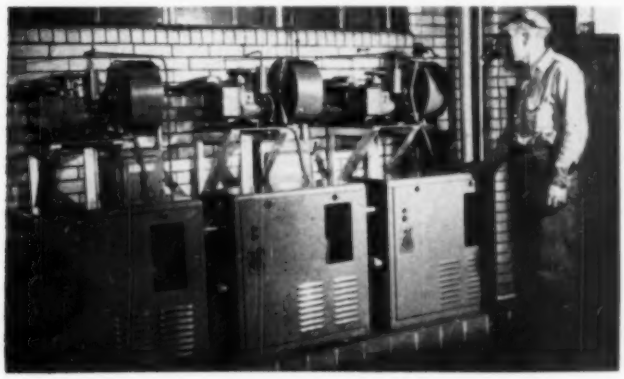
The boilers, rated at 550 hp, are now operating at 250% of rating. Only two of the three reconditioned boilers are presently in use, since they adequately handle the load which varies from 40,000 to 50,000 lb per hr per boiler. The third boiler serves as a standby.

Control System

The instruments and controls, through greater efficiency made possible by accurately controlled combustion, combined with the other changes we made in the boilers themselves, gave us the necessary increase in steam capacity.

The Hays instruments and controls also gave us a very satisfactory answer to the second part of our problem, that of regulating the steam that goes into process, by giving us accurate, automatic control of the load. As the demand fluctuates (and it sometimes varies as much as 20,000 lb per hr), the master controller on the main control panel follows it automatically and maintains balanced combustion.

Control is accomplished by (1) controlling the damper on the induced draft fan to obtain the correct furnace draft, (2) positioning the inlet damper of the forced draft fan to proportion the flow



BATTERY OF HAYS POWER UNITS IN CONTROL SYSTEM WHICH REGULATE COAL FEED.

of air to the amount of fuel, and (3) regulating the speed of the stoker to obtain the proper amount of fuel. Hays power units at these various stations are controlled by the master controller on the main instrument panel. A Hays tachometer blower operates with the power unit and the main panel in regulating the speed of the stokers, determining in this way the rate of coal feed.

Although we had not originally planned it as a part of the reconditioning project, we find that due to the properly controlled combustion, our maintenance on both stokers and boilers has been considerably decreased.

In addition to the master, air flow, fuel feed, and furnace draft controllers, the control boards contain pointer draft gages, steam pressure gages, Hays-Penn Boiler Meters, Reliance Eye-Hye water-level gages, and Hays-Penn feedwater recorder.

Instrumentation Improves Smelting Operation

ZINC smelting is a distilling operation, and the men who operate the retorts or stills must work for years before they develop the "zinc brains" to handle their complex jobs. But, having acquired the ability to do the job, even the best men distill substantially more zinc per week if they can check the distilling and other temperatures with modern pyrometers.

Operation

In the Eagle-Picher plant at Henrietta, Oklahoma, there are 40 distilling "stoves", etc., each holding 200 long, cylindrical ceramic retorts. A mixture of sintered zinc ore and coal is loaded into the retort, which is then set into the stove horizontally with its tapered nose projecting from the front wall. The tip of the retort is shut off with a plug of porous clay.

As the charge is heated in the retort, coal gas is expelled and burns at the plugged end. Zinc distilled from the mixture passes as a vapor to the air-cooled nose of the retort, and condenses. A "metal drawer" periodically removes the porous plug and scrapes out the accumulating zinc.

Instrumentation

Stove temperatures are recorded by multi-point Micromax Recorders. Altogether there are seven of these instruments, each serving four stoves. By providing operators with an automatic measurement of stove temperatures, this instrumentation improves smelting in several ways:

1. **Trouble Shooting is Easier.** Operators know that measurements are reliable, so if the instrument reports that temperature is off, they immediately make the necessary burner adjustments.

2. **Premature failure of retorts is considerably reduced,** because excessive temperatures can be avoided. High temperatures cause formation of an erosive slag which cuts the ceramic retort. Loss of retorts is now almost entirely confined to normal service depreciation.

3. **Low temperatures,** caused by excess fuel or air, **show up quickly** on the Micromax chart and can be corrected readily.

4. **Firemen can do their job better,** because they no longer need to rely on "eye estimates" of temperature.

In long heating operations like this, the Micromax automatic standardizing feature proves invaluable. Every 45 minutes, the instrument checks its measuring circuit against its precise internal standard and makes any necessary adjustments.

METAL DRAWER REMOVES ZINC FROM RETORTS.

THE FLAME AT THE END OF EACH RETORT IS CAUSED BY COAL FROM THE CHARGE. BARS OF FINISHED ZINC ARE IN THE FOREGROUND.

FRACTIONAL GRADES enable you to choose the exact degree of hardness desired by splitting every normal grade into three degrees of hardness, where a whole grade change would be too great.

. . . and all manufactured in FRACTIONAL GRADES. This outstanding and exclusive Bay State development eliminates using segments that are "close enough" for hardness grade. FRACTIONAL GRADES permit a precise selection of grade for the work intended.

ADVANTAGES: Increased Production . . . Faster Stock Removal . . . Sharper, Cooler Cutting . . . Better Finish . . . Closer Tolerance . . . Lower Power Consumption.

BAY STATE'S other abrasive products for surfacing jobs are also available in FRACTIONAL GRADES.

BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.
Chicago, Cleveland, Detroit, Pittsburgh.

BAY STATE

To Bay State Abrasive Products Co., Dept. IW, Westboro, Mass.

We are interested to be shown how Fractional Grades can be applied to our grinding requirements. It is understood that we assume no obligation.

☐ Please send your abrasive engineer. ☐ Please send descriptive literature.

Company _____

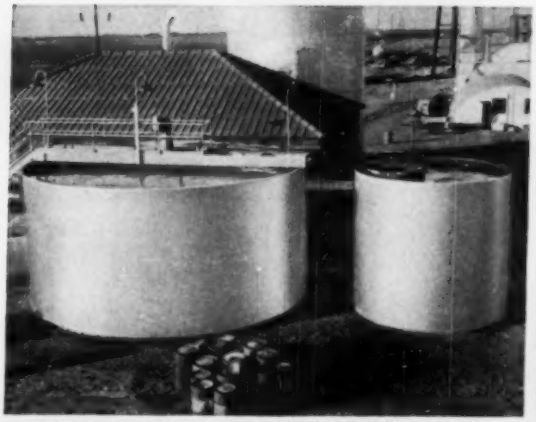
Street _____

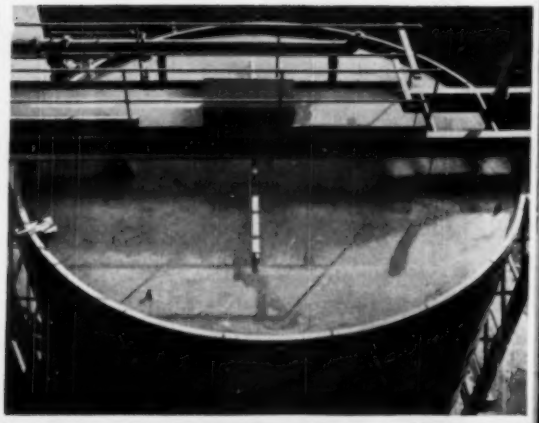
City and State _____

Name _____ Position _____

COCHRANE •Sludge• Contact REACTORS

ECONOMICAL REMOVAL OF IMPURITIES FROM INDUSTRIAL WATER SUPPLIES—TURBIDITY, COLOR, HARDNESS—REMOVAL OF SUSPENDED SOLIDS FROM WASTE





COCHRANE'S recognized authority in the field of water conditioning is exemplified in the relatively new field of water clarification by flocculation, in the improved Cochrane Sludge Contact Reactor. This equipment is meeting with pronounced success wherever it has been installed.

The Cochrane Sludge Contact Reactor is distinguished by the fact that the sludge bed is always in suspension, so that the sludge is always present when chemicals and water react.

This is important, in that the precipitates or sludge must not be allowed to settle out on the floor of the tank if maximum clarification or softening is to be obtained. The water as it rises through the sludge bed is both treated and filtered.

Cochrane Sludge Contact Reactors are applicable to

1. Municipal and industrial plants for coagulation and/or softening, removal of turbidity, color, hardness, taste and odor
2. Boiler plants for silica removal
3. Fluoride removal, de-alkalization, iron and manganese removal
4. Paper, textile and other plants for process water—recovery of fibre stock and filler from white water

NEW PUBLICATION AVAILABLE

A new bulletin describing the Cochrane Sludge Contact Reactor, and illustrating different applications is just off the press. A copy will be sent on request.

COCHRANE CORPORATION, 17th St. & Allegheny Ave., PHILADELPHIA 32, PA.

In Canada: Canadian General Electric Co., Ltd., Toronto • In Mexico: Babcock & Wilcox de Mexico S. A., Mexico City

COCHRANE CORPORATION
3110 N. 17th Street, Philadelphia 32, Pa.

Please send me a copy of Publication No. 5001 on Sludge Contact Reactors.

NAME .....
FIRM .....
ADDRESS .....
CITY ..... ZONE ... STATE .....

87 YEARS OF SERVICE

COCHRANE

NEWS
FOR SOUTHERN INDUSTRY

Kentucky Synthetic Rubber Plant Reactivated

KENTUCKY SYNTHETIC RUBBER CORPORATION, Louisville, Kentucky, will reactivate the $7,000,000 government-owned synthetic plant by January 1, 1951. The newly organized corporation is composed of rubber companies, outside the tire division of the industry, which will operate the plant. THOMAS ROBINS, JR., president of Hewitt-Robins, Inc., is president of Kentucky Synthetic. GEORGE F. GOODYEAR is secretary, and LEO CLIFFORD is controller and assistant secretary.

The new firm has engaged Firestone Tire and Rubber Company to perform the actual demothballing process. Since the shutdown of the plant in 1947, it has been maintained in a storage condition by the Minnesota Mining and Manufacturing Co.

Gulf States Utilities Elects Riegel

L. F. RIEGEL, General Sales Manager of Gulf States Utilities Company for the past 14 years, has been elected a Vice Presic'ent of the Company. He will continue to direct the Company's sales activities.

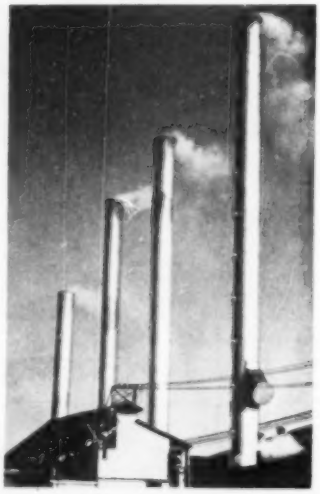
Mr. Riegel is an electrical engineering graduate of the University of Minnesota. Immediately after graduation, he went to work for the Northern States Power Company at Minneapolis. From there he was transferred to the Connecticut Power er Company at Middletown, then to Savannah Electric and Power Company. In 1925 he became General Sales Manager of the Virginia Electric & Power Company, where he remained until transferred to the GULF STATES UTILITIES with headquarters in BEAUMONT, TEXAS.

J. J. Finnigan Co., Inc., Celebrates 62nd Year

Over 250 officials, employees and guests of the J. J. Finnigan Company recently celebrated the Atlanta firm's 62nd year in business. Finnigan, one of Atlanta's oldest concerns, has been in continual operation since 1888—producing boilers, tanks, pressure vessels, smokestacks and industrial power equipment.

Just prior to their anniversary, J. J. Finnigan Company had joined two new buildings to the original structure, adding 10,000 sq ft of floor space. This, plus new fabricating equipment, will increase the plant's productive capacity to meet the demands of industry.

Finnigan, boasting one of the most complete boiler plants in the Southeast, has gained recognition in the fabrication of steel, stainless steel, stainless clad, and other alloy equipment; has earned an enviable reputation in the fabrication of stainless steel vats for packaging dyeing and sizing in the textile trade; and is presently equipped to assist in the design and specifications for various industries requiring special built items.



THESE FOUR SMOKESTACKS IN OPERATION AT THE ATLANTIC STEEL COMPANY, ATLANTA, GEORGIA, WERE INSTALLED BY THE J. J. FINNIGAN COMPANY.

FUTURE EVENTS
Of Engineering Interest

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, Sec'y, 29 West 39th St., New York, N. Y.
Nov. 26-Dec. 1, Annual Meeting, Hotel Statler, New York, N. Y.

NATIONAL POWER SHOW, International Exposition Co., Grand Central Palace, New York 17, N. Y.
Nov. 27-Dec. 2, Grand Central Palace, New York, N. Y.

AMERICAN SOCIETY OF REFRIGERATING ENGINEERS, M. C. Turpin, Sec'y, 40 West 40th St., New York 18, N. Y.
Dec. 3-6, Annual Convention, Hotel Commodore, New York, N. Y.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, Sec'y, 29 West 39th St., New York, N. Y.
April 2-5, 1951, Spring Meeting, Hotel Atlanta-Biltmore, Atlanta, Ga.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, Sec'y, 29 West 39th St., New York, N. Y.
April 17-19, 1951, Process Industries Conference, Baltimore, Md.

SSIRCO—New Orleans

SELDEN S. PARTRIDGE, JR., has been appointed manager of SOUTHERN STATES IRON ROOFING CO.'s plant in NEW ORLEANS, LOUISIANA. He replaces JOHN P. STARNES, who was recently promoted to district sales manager in NASHVILLE, TENNESSEE.

Partridge joined Southern States in February, 1947, as purchasing agent of the BIRMINGHAM, ALABAMA, plant. Later that year he was promoted to purchasing agent for the entire company.

◆

Pacific Pumps—Houston

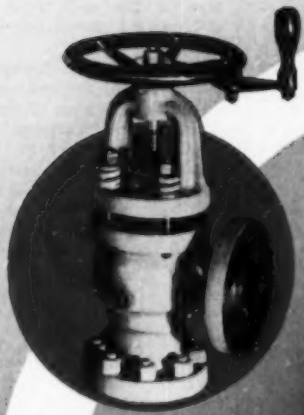
PACIFIC PUMPS INC., manufacturers of centrifugal pumps, announce the appointment of JOHN WAHLSTRAND as Sales Engineer with headquarters in the HOUSTON Office of the company. Wahlstrand is an associate member of the Houston Engineers' Club and is well known throughout the petroleum, chemical and other industries in TEXAS, LOUISIANA, MISSISSIPPI and ALABAMA.

◆

Henry Disston—Carolinas

HENRY DISSTON & SONS, INC., Philadelphia 35, Pa., has announced the appointment of KERMIT L. CROW as sales representative in NORTH CAROLINA and SOUTH CAROLINA on the company's full line of industrial equipment, including distribution and consumer servicing.

RYLAND P. BRYANT, who has been working on the general industrial line has been relieved of other responsibilities to act as a specialist on wood-cutting problems.



Yarway Seatless Blow-Off Valve, with no seat to score, wear, clog, or leak. See Bulletin S-424.

Yarway Impulse Steam Trap. Also available with integral strainer. See Bulletin I-1739.

Yarway Fine Screen Strainer. See Bulletin S-203.

Yarway Remote Liquid Level Indicator for water level or pressure differential indication. See Bulletin WG-1823.

the "WILFRED SYKES" signs on a Yarway Crew

When the "Wilfred Sykes," largest ship on the Great Lakes, went into service recently, she was fitted out with four kinds of Yarway steam plant equipment.

The engineers who designed this newest and greatest of Inland Steel Company's freighters, selected Yarway Remote Liquid Level Indicators, Seatless Blow-Off Valves, Impulse Steam Traps, and Fine Screen Strainers.

Just as dependable for marine use as they are in thousands of steam plant installations across the land, these Yarway products are helping this Great Lakes ship set new records in her ore-carrying runs from Duluth to Indiana Harbor.

If you're looking for the kind of service in your plant that marine engineers *must* have in theirs, check on these Yarway products. There's a Yarway office near you, or write direct for the product bulletins you want.

YARNALL-WARING COMPANY
Home Office: 116 Mermaid Ave., Philadelphia 18, Pa.
Southern Representative: ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

YARWAY

STEAM PLANT EQUIPMENT

Kennedy Valve—Southeast

JAMES R. ERVEN has been appointed salesman for THE KENNEDY VALVE MFG. CO. Elmira, N. Y., in the States of LOUISIANA, MISSISSIPPI and part of ALABAMA.

Before joining the Kennedy organization Erven was employed by the Calmes Engineering Company, New Orleans, and the Tampa Shipbuilding Company, Tampa, Florida.

Erven will handle sales for the complete Kennedy line of bronze and iron body valves, waterworks valves and fire hydrants, malleable iron, bronze and cast iron pipe fittings.

◆

Westinghouse—Little Rock Plant

THE WESTINGHOUSE ELECTRIC CORPORATION will add a 100,000-square-foot wing to its lamp plant in LITTLE ROCK, ARKANSAS.

The construction firm of DITMARS, DICKMANN, AND PECKENS, of Little Rock has been awarded the contract for the design and construction of the addition, which will have a 200-foot front and be 516 feet long. Completion is scheduled for April, 1951.

Incandescent light bulbs ranging from the 15-watt through 300-watt size make up the bulk of Westinghouse production at Little Rock. Sun lamps, heat lamps, and mercury vapor lamps also are manufactured there.

◆

DuPont Expands in South

E. I. DU PONT DE NEMOURS & COMPANY has taken an option on a tract of approximately 635 acres on the Neuse River between KINSTON and GRAINGER, N. C., for the site of a new nylon yarn plant.

Approximately 1,200 people will be required to operate the plant when completed. Construction work, which will be handled by the Engineering Department of the Du Pont Company with sub-contracts for such specialties as job conditions warrant, is expected to start early next year. Approximately 18 months will be required for completion after start of construction.

The world's first plant at SEAFORD, DEL., is being expanded at present as is the plant at CHATTANOOGA, TENN. Both projects are scheduled for completion early next year.

The company recently announced an expansion program for the plant at MARTINSVILLE, VA., and construction is under way on a new plant at VICTORIA, TEXAS, for the manufacture of additional basic intermediates.

A Statement to Customers of the Atlantic Steel Company and its Warehouse Division

THREE YEARS AGO Atlantic Steel Company established a Warehouse Division. It is similar to those operated by other steel mills throughout the country.

This division could have been called the X Y Z Company, had we wished to hide our identity with it. But we were proud of this added service to our customers, and we wanted to be closely identified with it.

In a very real sense, it is operated as a separate business. It must stand on its own feet—financially and otherwise.

Our Warehouse Division buys a wide variety of typical steel warehouse products from many companies. It also places orders with our own mills.

* * *

At times the Warehouse Division is likely to have in stock items which are not readily available from our mills. This does not mean, however, that the Warehouse Division gets more than its fair share of Dixisteel products, or that it can get them when other customers can't.

No special preference is given such orders. They are placed and filled in exactly the same manner as all other orders from all other customers.

Orders from our own Warehouse Division account for less than 4% of our total annual tonnage.

Like any good business, our Warehouse Division places its orders only as far in advance as sound judgment and actual needs dictate.

* * *

Our Warehouse Division will continue to operate on the same sound business principles which have guided it to its present successful position. It will continue to serve to the best of its ability.

Present high demands for steel place an extra burden on all metal producers and distributors.

* * *

First, it calls for maximum production. The nation's steel mills are producing close to 100% of capacity. The Atlantic Steel Company is producing at 106% of normal capacity. We are producing more steel than at any time in our history!

Second, this high demand calls for the handling of every order in a fair and impartial manner. This comes easy to us, for we have always operated on that basis. Our business has been built on that policy. We will always be guided by it.

* * *

In spite of our efforts, we have never caught up with the demand for some mill products. Thus it has been necessary to allocate them all along.

In doing this, we found that the best-qualified persons to handle this extremely important phase of our business were our field representatives. These men know their customers and their needs. They are in the best position to prevent stockpiling and to weigh each order with fairness and impartiality.

Being salesmen at heart, they naturally appreciate the importance of satisfied customers, and they are doing all they can to keep customers satisfied.

* * *

We wanted you to know about these matters because we feel that a good understanding of them is essential to good business relations.

R. S. Lynch *President*

Atlantic Steel Company

Marley Promotes Maze

The promotion of Roy W. Maze to the position of merchandising sales manager of The Marley Company, Inc., Fairfax and Marley Roads, Kansas City 15, Kans., has been announced. The company produces water cooling equipment.

A native of Kansas City, Kansas, Maze received his A.B. degree from the College of Emporia and an M.S. from Kansas State College.

In 1946, Maze joined The Marley Company as public relations director, the position he held until his recent promotion.

◆

National Supply Acquires Atlas

The National Supply Company, Pittsburgh, Pa., recently purchased the assets of the engine division of the Atlas Imperial Diesel Engine Company, Oakland, California.

The National Supply Company has long been a manufacturer of diesel, dual-fuel, and natural gas engines at its engine division plant located at Springfield, Ohio. The manufacture of Atlas Imperial diesel engines and parts will be carried on at the Springfield plant.

◆

Hercules to Build Mississippi Plant

Hercules Powder Company has awarded a contract for the construction of a new plant for the production of toxaphene, a chlorinated camphene insecticide used in killing the cotton boll weevil and other crop and livestock pests, to The H. K. Ferguson Company, Industrial Engineers and Builders.

The plant to be located at Hattiesburg, Miss., will increase the production of toxaphene by almost 50 per cent and construction will cost approximately $1,500,000. Work will start immediately, and initial production is scheduled for February, 1951.

A similar plant has been operated by Hercules Powder Company at Brunswick, Ga., since 1947. Hercules manufactures only the basic toxaphene, which is used by manufacturers of insecticides to make agricultural dusts and sprays. To form toxaphene, camphene is derived by chemical processing from turpentine and reacted with chlorine.

Hattiesburg was selected as the plant site to bring the product closer to the cotton-growing regions of Mississippi, Arkansas, Louisiana and Texas.

How *soft* feed water comes from these structures

The Texas Company uses hard well water for boiler feed at its Eagle Point Refinery near Westville, N. J. This hardness must be reduced or scale in the boiler tubes would hinder effective heat transfer.

The two-stage Permutit hot process water softener shown above was installed at the Eagle Point Refinery recently. In the first stage, the water is pre-heated and given a dolomitic lime and soda-ash treatment which reduces the hardness to approximately 12 or 15 parts per million and the silica to about 1 ppm. The water then flows by gravity to the second tank where it receives a treatment with monosodium phosphate. This chemical reduces the hardness to approximately 2 ppm and also cuts the alkalinity slightly. From the second tank, the treated water passed through pressure filters to a deaerating heater. Then it flows to the boilers.

The process is continuous and capacity of the softener and filters is 100,000 gals per hr.

These water-softening tanks are examples of the steel plate structures we furnish to industry. Installations for Southern locations are fabricated at our Birmingham plant and erected with our Birmingham Erection District Crews. Write our nearest office for estimates whenever you need a steel plate structure.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3.....2180 Healey Bldg.
Birmingham 1.....1531 North Fiftieth St.
Boston 10.....1044—201 Devonshire St.
Chicago 4.....2107 McCormick Bldg.
Cleveland 15.....2218 Guildhall Bldg.
Detroit 26.....1834 Lafayette Bldg.
Houston 2.....2132 National Standard Bldg.
Havana.....402 Abreu Bldg.
Los Angeles 17....1545 General Petroleum Bldg.
New York 6.....3312—165 Broadway Bldg.
Philadelphia 3.....1646—1700 Walnut St. Bldg.
Salt Lake City 4.....545 West 17th South St.
San Francisco 4.....1531—200 Bush St.
Seattle 1.....1345 Henry Bldg.
Tulsa 3.....1628 Hunt Bldg.

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

Nelson Stud Welding—Southern Appointments

THE NELSON STUD WELDING DIVISION of MORTON GREGORY CORP., Lorain, Ohio, has authorized the WELDING GAS PRODUCTS CO., CHATTANOOGA, TENN., and J. W. FRASER & CO., CHARLOTTE, N. C., as sales, rental, and service dealers.

FILLINGHAM BROS., 1050 Pearl St., JACKSONVILLE, FLA., is an approved applicator for Nelson Stud Welding in northern FLORIDA and southeastern GEORGIA.

•

Reynolds Appoints Gwynne

J. M. GWYNNE has been appointed manager, Engineering Sales, Building Products Section, Parts Division, REYNOLDS METALS COMPANY, it was announced recently by W. G. REYNOLDS, vice president and manager, Parts Division, LOUISVILLE, KENTUCKY.

Mr. Gwynne's previous business connections include Southern States Iron Roofing Company where he was manager of dealer and export sales and project manager of war contracts. He also was executive vice president and general manager of U. S. Products Corporation exporting aluminum sheet, building products and prefabricated houses.

Since August, 1947, Mr. Gwynne has been executive vice president and general manager of Metal Arts Manufacturing Company of Atlanta, Ga. There he designed a wide line of aluminum building products and set up national distributors.

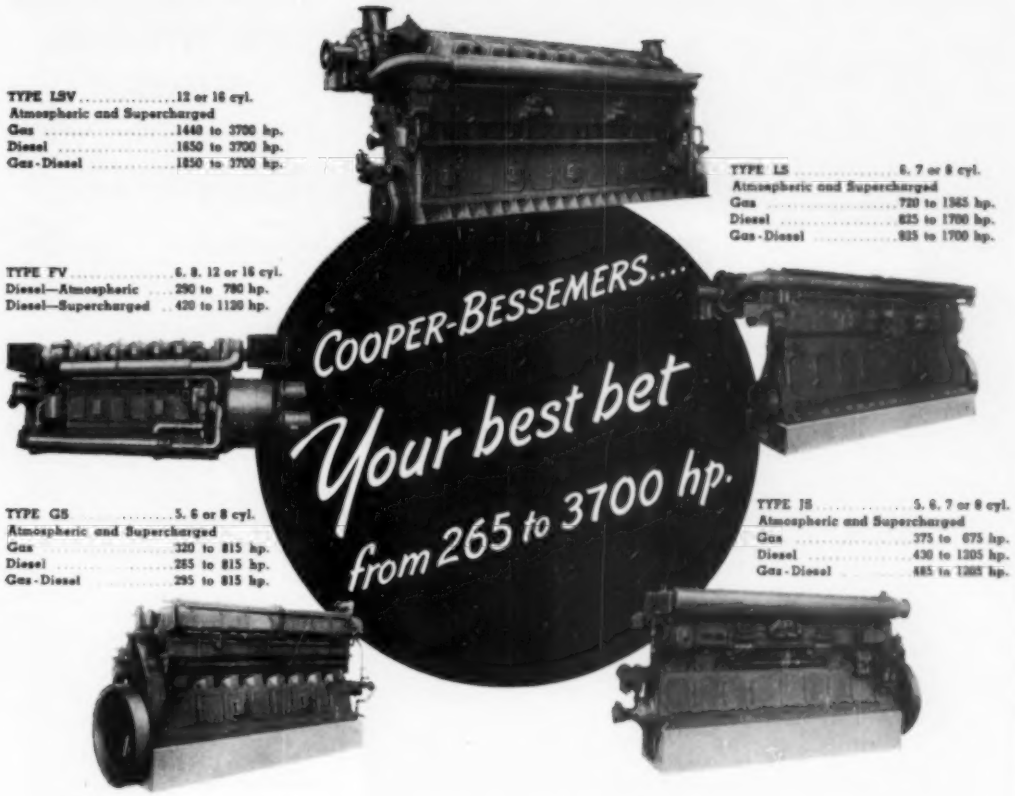
•

CP&L Expands

LOUIS V. SUTTON, president of the CAROLINA POWER & LIGHT COMPANY, RALEIGH, N. C., has announced that a third generating unit will be installed in the company's steam electric generating plant at LUMBERTON, N. C.

The new unit should be in production by the end of 1952. It will have a capacity of 100,000 hp. Operating at capacity 85 per cent of the time, the Lumberton plant will be capable of producing over one and a quarter billion kilowatt hours per year.

At present, construction on a 200,000 hp plant at GOLDSBORO is under way, and the first unit of 100,000 hp is expected to be in production by the middle of 1951, with the second unit in production a year later. These two Goldsboro generators will be capable of producing over a billion kilowatt hours per year.



Pictured above are Cooper-Bessemer engines of five different types. They are ideal for digester gas operation either as spark-ignited gas engines or as gas-diesels burning oil in combination with gas as conditions demand.

Highly important, please note that even the spark-ignited gas engines can now be supercharged! This new Cooper-Bessemer development offers much higher efficiency than ever before. You can save on space . . . and fuel goes much further!

Note also the horsepower ratings given. These are the latest as influenced by other developments and improved operational features.

Above all, these Cooper-Bessemers are rugged, work-wise engines if there ever were any. They're engineered throughout to assure the long life, low maintenance and high return for which Cooper-Bessemers have long been noted. Check with the nearest Cooper-Bessemer office on your power plans for the future. Be sure to get all the facts on the new features that pay off for Cooper-Bessemer users again and again.

The
Cooper-Bessemer
Corporation

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

New York Washington, D. C. Bradford, Pa. San Francisco Houston, Dallas Greggton, Pampa and Odessa, Texas Seattle Tulsa Shreveport St. Louis Los Angeles Chicago Caracas, Venezuela Cooper-Bessemer of Canada, Ltd., Halifax, Nova Scotia Gloucester, Mass. Calmes Engineering Co., New Orleans, La.

TECHNICAL BOOKS

Procedure Handbook of Arc Welding Design and Practice

PREPARED AND PUBLISHED BY THE LINCOLN ELECTRIC CO., 12818 Coit Road, Cleveland 1, Ohio.

6 x 9 inches—1200 pages.
Price, $2.00.

This 9th Edition has been reorganized to bring information up-to-date and include recent welding developments. New data and latest procedures are given for welding all metals and alloys commonly welded with manual open arc and hidden arc welding as well as automatic and semi-automatic hidden arc welding.

Contents include a completely new chapter on weldability; additional facts on structural design, welded rigid framing, machine design; and a new chapter on welded design data, giving fundamentals, such as stress allowables, which can be applied to particular design problems.

The volume is illustrated with more than 1300 photographs and drawings.

◆

Industrial High Frequency Electric Power

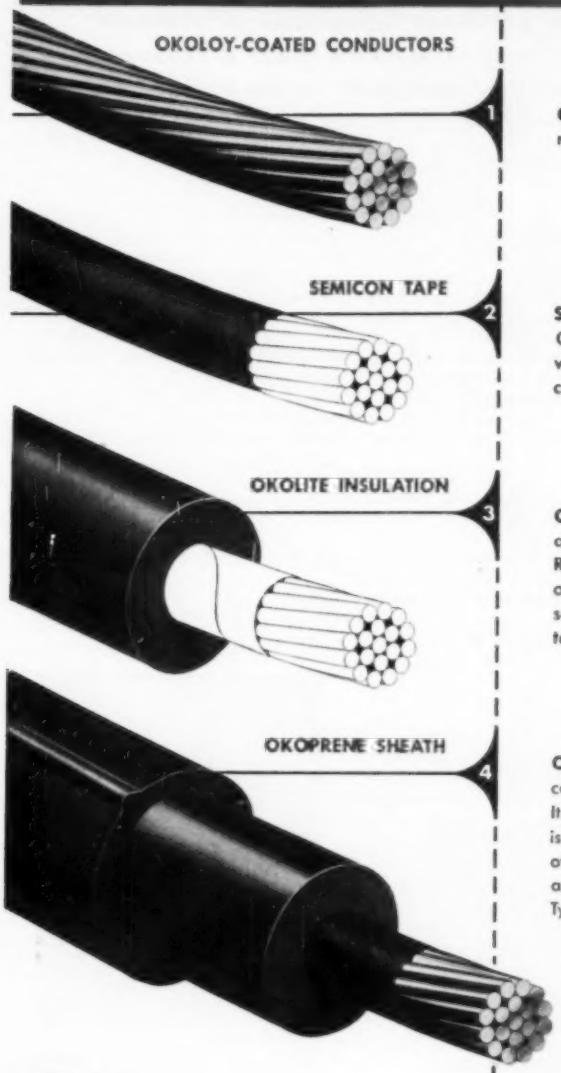
By E. MAY
PUBLISHED BY JOHN WILEY & SONS, INC., 440 4th Ave., New York 16, N. Y.

6 x 9 inches—355 pages.
Price, $5.00

This book is an introduction to the subject of applying high frequency heating to industrial problems. Basic facts included are a summation of the a-c theory involved in tuned and coupled circuits as encountered in high-frequency heating work; discussion of the arc and spark oscillators; a presentation of high frequency alternators which gives a working knowledge of the problems involved in designing such alternating equipment; discussions of the triode tube and the Class B and C amplifiers; a theoretical presentation, plus practical applications, of induction heating; and information on dielectric heating and auxiliary and measuring equipment.

Plant personnel with limited experience in high frequency heating will find this book a useful source of information.

4 reasons why OKOLITE-OKOPRENE CABLES EXTEND CIRCUIT LIFE



Okoloy coating on conductors—the special corrosion-resistant lead alloy that outlasts tinning 2 to 1.

Semicon tape over conductors—used in all Okolite-Okoprene cables operating at over 2,000 volts—eliminates internal corona cutting and increases dielectric strength.

Okolite insulation—moisture-resisting, high-voltage Okolite is made with Up-River Fine Para Rubber, the best grade of natural rubber. This oil-base insulation has been proved in years of service and is approved by Underwriters' Laboratories, Inc. as Type RW.

Okoprene sheath—the pioneer neoprene cable covering developed in the Okonite laboratories. Its life-extending durability and stable characteristics have been demonstrated on millions of feet of cable installations. Okolite-Okoprene cable is approved by Underwriters' Laboratories, Inc., as Type RWSN.

Besides these four basic features, Okolite-Okoprene cables possess many other advantages in installation, operation, design and manufacture. For complete information on characteristics and applications, write for Bulletin SP-1037. The Okonite Company, Passaic, N. J.

THE BEST CABLE IS YOUR BEST POLICY

OKONITE SINCE 1878 *insulated wires and cables*

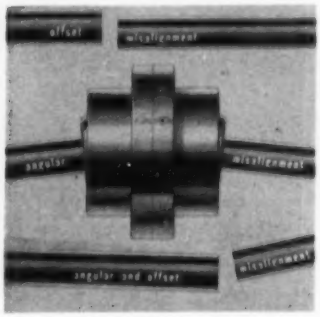
0250

NEW EQUIPMENT for Southern Industry

Free additional information is available to readers of Southern Power & Industry. Check item code number on the postage free service coupon post card provided on p. 17.

Flexible Coupling

M-1 AJAX FLEXIBLE COUPLING CO., INC., Westfield, N. Y., has introduced a new flexible coupling designed to handle angular and offset misalignment up to 7 degrees with a standard coupling, and special models up to 12 degrees.



The manufacturer states that capacity and performance are based on a new tooth shape which provides for maximum misalignment with minimum clearance or backlash. It is said to simplify machine design by eliminating necessity for precision alignment of driving and driven shafts.

The couplings are suitable for use where alignment problems are caused by normal bearing wear, old or inadequate wooden floors, weaving chassis or structural mountings such as are created by temperature changes, settling or heaving foundations.

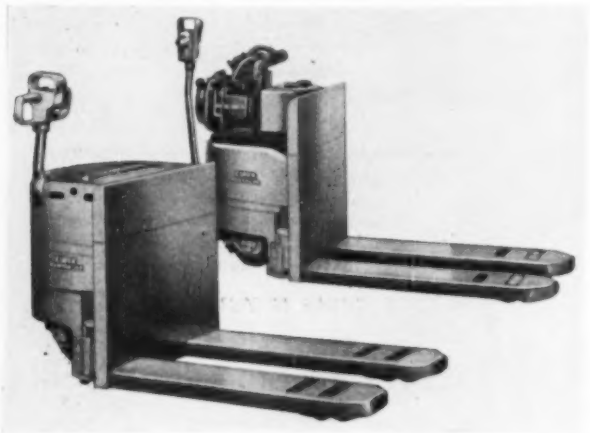
A graduated line of standard sizes and capacities is available. Special flangeless or sleeve type couplings may be had for use where outside diameters must be held to a minimum. Further details are given in the manufacturer's Bulletin No. 50.

Hand Trucks in Two Power Types

M-2 CLARK EQUIPMENT COMPANY, Industrial Truck Division, Battle Creek, Mich., have announced 6,000 lb capacity hand trucks in two power types: the Electro-Lift, battery powered with motor drive; and the Hydro-Lift, gasoline engine-powered with hydraulic pump and motor drive.

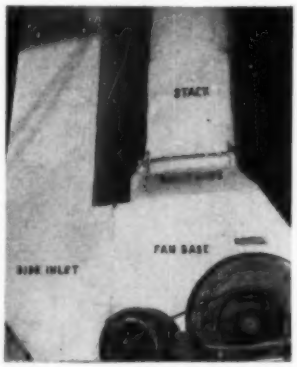
Electro-Lift is driven by a new GE compound motor. Automatic acceleration, full enclosed drive unit, almost uniform speed on levels and a self-energizing brake of the external contracting type are features.

The Hydro-Lift has a gasoline engine driving a hydraulic pump and motor. Hydraulic motor is mounted in the same manner as the electric motor—in the 14-in. drive wheel, with output shaft driving through a reduction to an internal gear in the wheel. Gas engine drives a hydraulic pump, which in turn drives a constant displacement hydraulic motor of vane type with a sequence valve. Automatic torque multiplication provides ample reserve power.



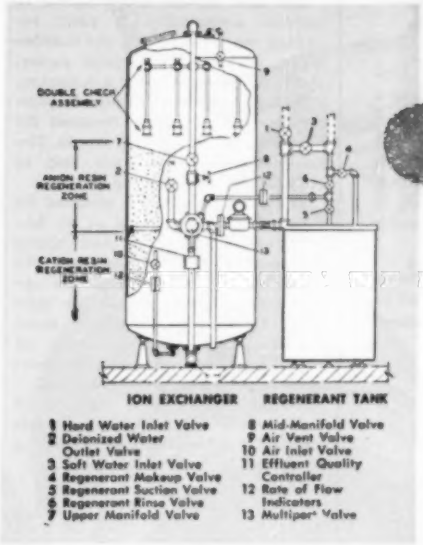
Induced Draft Fan Stacks

M-3 PRAT-DANIEL CORP., East Port Chester, Conn., has introduced fan stacks designed for use in small plants. The manufacturer states that the units



are rigid and self supporting. Operation is said to be simple and direct, eliminating breechings and relieving the plant engineers of responsibility for draft production. Fan, breeching and stack are completely integrated and installed as a unit. This method of construction reduces initial cost and an unbalanced operating draft unit.

Highest Quality Mineral-Free Water At FRACTION of Evaporated Water Cost



ELGIN Mono Flo DEIONIZER

(single tank unit)

Only 18c* per 1000 gallons compared with $5.00 per 1000 gallons for evaporated water

*Based on 10 grain water

SOME OF OUR OTHER PRODUCTS

- Zeolite Water Softeners
- Dealkalizers
- Silica Removers
- Degasitors
- Water Filters
- Corrosion Control
- Feedwater Treatment
- Chemical Feed Systems
- Iron Removal Equipment
- Water Treating Chemicals
- Water Testing Equipment

Write for Bulletins

Here is a truly revolutionary development—a single tank "monobed" deionizer that brings the cost of high quality demineralized water within the range of those who have heretofore found evaporated or distilled water prohibitive in cost. Here is the perfect boiler feedwater that assures freedom from scale, corrosion, carryover and costly blowdown. Yet the overall cost is comparable with ordinary water conditioning equipment or treatments.

The single column Elgin DeIonizer produces water of higher quality than delivered by two and four-column demineralizers. In fact, for nearly all purposes, the water is freer from impurities than *distilled* water — and at a fraction of the cost. Naturally the compact Elgin MonoFlo DeIonizer costs far less to buy and operate. It requires but little space — is simple in operation — cuts regeneration time and rinse water requirements — and has other notable Elgin features which make it today's outstanding deionizing equipment.

Similar in design and function, but utilizing different ion-exchange resins, the Elgin Ultra-DeIonizer also *completely removes silica and CO_2.*

These DeIonizers incorporate the famous Elgin "Double Check" manifold assembly which permits the use of a deeper bed of ion-exchange resins without loss — giving a marked increase in demineralized water output.

Write today for detailed information

ELGIN SOFTENER CORPORATION

132 North Grove Avenue, Elgin, Illinois

ELGIN ECONOMICAL WATER CONDITIONING SINCE 1908

Water Conditioning Since 1908

Fork Lift Trucks

M-4 MOBILIFT CORPORATION, Portland, Oregon, has announced two new Lev-R-Matic controlled fork lift trucks, both of 2,000 lb capacity.

The new models are designed to increase accessibility of parts requiring regular servicing and maintenance, make major repairs easier, and reduce down-time to a minimum.

Both trucks feature a new 3-cylinder heavy-duty engine, designed for exclusive use in fork lift trucks. The Lev-R-Matic controls are said to eliminate all gear shifting.

The stand-up model is designed for instant finger-tip control of all forward, back, elevating and tilting movement without shifting gears. The starter switch is placed so the operator can depress it with his right knee. A full view instrument panel has the ignition switch, choke, oil pressure gauge and ammeter functionally placed on a slanted panel.

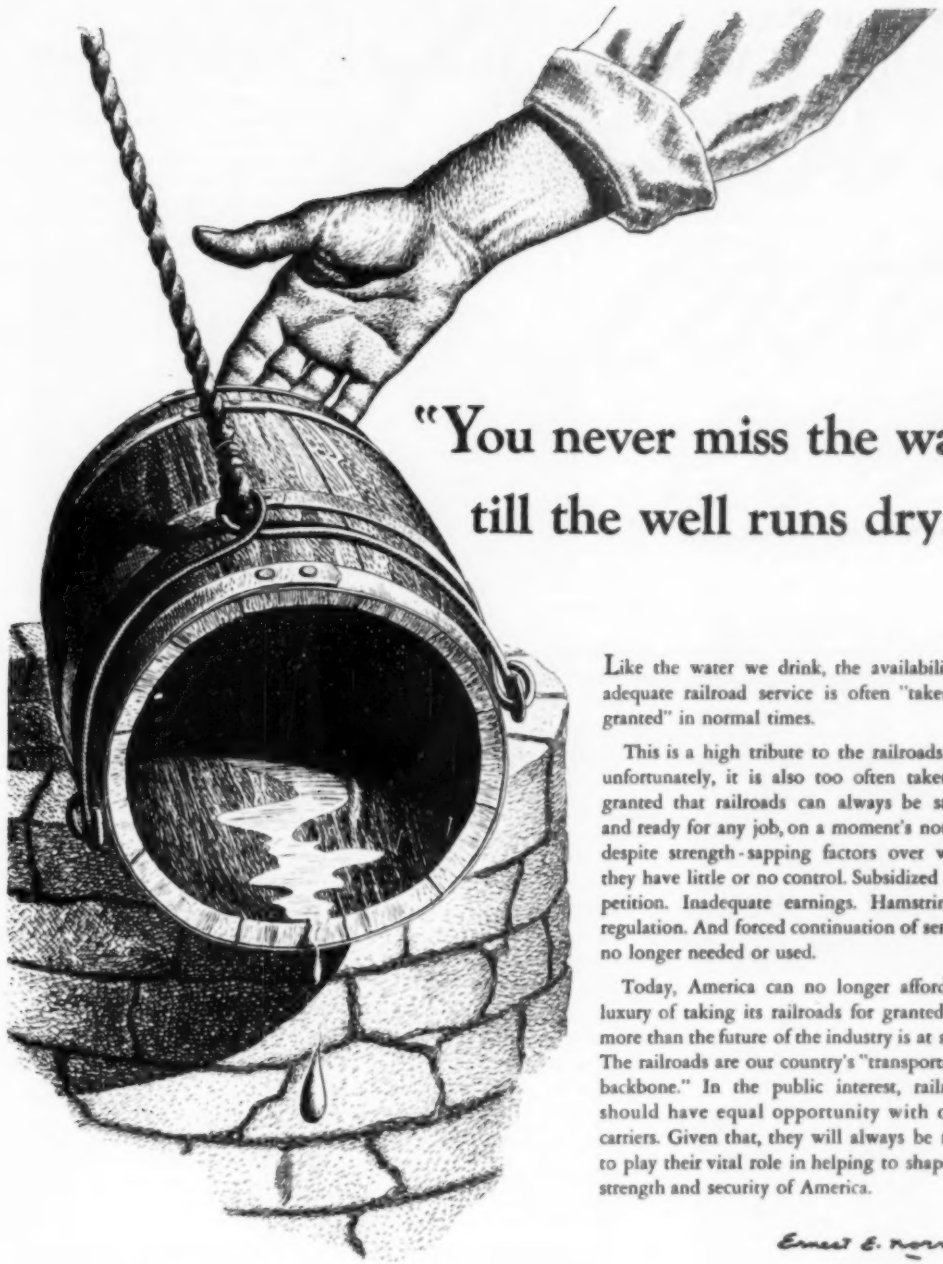
The sit-down type is designed for work where the driver can operate efficiently without frequently getting on and off.

◆

Steam Trap

M-5 YARNALL - WARING COMPANY, Mermaid Lane, Philadelphia 18, Pa., has made a recent improvement in the Yarway impulse steam trap, by means of a stainless steel body used in place of the cold-rolled-steel cadmium-plated body previously furnished for working pressures up to 400 lb and temperatures up to 450 F. Internal parts, as before, are made of selected stainless alloys.

Further information is given in Bulletin T-1739, available on request.



"You never miss the water till the well runs dry..."

Like the water we drink, the availability of adequate railroad service is often "taken for granted" in normal times.

This is a high tribute to the railroads. But unfortunately, it is also too often taken for granted that railroads can always be strong and ready for any job, on a moment's notice... despite strength-sapping factors over which they have little or no control. Subsidized competition. Inadequate earnings. Hamstringing regulation. And forced continuation of services no longer needed or used.

Today, America can no longer afford the luxury of taking its railroads for granted. For more than the future of the industry is at stake. The railroads are our country's "transportation backbone." In the public interest, railroads should have equal opportunity with other carriers. Given that, they will always be ready to play their vital role in helping to shape the strength and security of America.

Ernest E. Norris
President

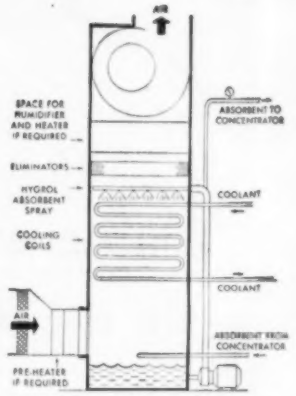
SOUTHERN RAILWAY SYSTEM

How You Save with the NEW Niagara Method of Air Conditioning

Using "Hygrol" Hygienic Absorbent Liquid

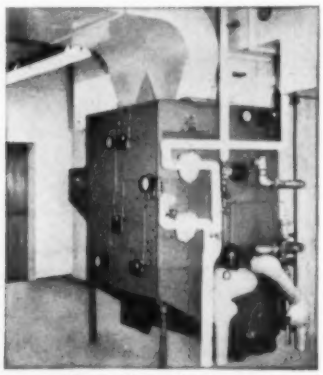
Because it absorbs moisture from the air directly, the new Niagara Controlled Humidity Method uses less, or no, mechanical refrigeration for dehumidifying. You save first costs and installing of heavy machinery. You save space, maintenance expense, power. You get easier, more convenient operation.

Using "Hygrol" hygienic absorbent liquid, this method gives complete control of temperature and relative humidity. Especially, it is a better way to obtain dry air for drying processes, packaging hygroscopic materials, preventing moisture damage to metals, and obtaining better quality for chemical process products and food products—or in obtaining better results in comfort air conditioning for office or laboratory at lower refrigeration costs.



NIAGARA CONTROLLED HUMIDITY METHOD — FLOW DIAGRAM


Food Packaging under Controlled Humidity


Niagara Controlled Humidity Air Conditioner

The diagram shows how filtered air is dehumidified by passing thru a spray of "Hygrol"—a liquid absorbent which removes air-borne moisture. This liquid is hygienic and non-corrosive; it contains no salts or solids to precipitate and cause maintenance troubles. It is continuously re-concentrated at the same rate at which it absorbs moisture, providing always the full capacity of the air conditioner, automatically.

Units provide a range of capacities from 1000 to 20,000 C. F. M. Multiple unit installations are in use successfully. Records of results are available. For further information, write Niagara Blower Co., Dept. SP, 405 Lexington Ave., New York 17, N. Y.

(Advertisement)

C. K. Sharp, Pres.

Steam Cylinder Lubricator

M-6 SHARVANIA OIL & GREASE CORP., Memphis 1, Tenn., announces a new lubricating instrument, LUBE-O-MIZER for steam cylinders.

The device is said to automatically retard the lubricant within itself, and mixes it with condensed steam. The mixture is then heated and forced into steam cylinders in the form of "fog". This "oil-fog" is carried in suspension by the steam to completely cover all contact working surfaces of cylinder walls, rings and valves. Additional operating data will be furnished upon request.

◆

Stoker

M-7 WESTINGHOUSE ELECTRIC CORPORATION, P. O. Box 2099, Pittsburgh 30, Pa., is producing a spreader type stoker with traveling grate designed to meet the requirements of medium to large industrial plants and central stations. These stokers have a fuel-burning capacity covering a range of from 30,000 to over 350,000 pounds of steam per hour.

The manufacturer states that efficient, economical combustion of any bituminous coal and lignite is obtainable. Coal is spread by a hydraulic motor-driven overthrow rotor so that it falls evenly over the entire length of the fuel bed. The forward-moving traveling grate discharges ashes continuously at the front. Effective air seals permit ample opening between the grate and bottom of front wall for the discharge of ash from high ash coal.

Coal is fed to each rotor by two long-stroke, constant velocity rams. A coal-feed equalizer plate driven from the rotor oscillates across the incoming fuel assuring continuous uniform feed whether the coal is wet or dry. Complete integrated hydraulic drive system for fuel feed, fuel distribution, and grate drive provides a synchronized drive with independent control and adjustment for each element.

Optimum fire bed condition is maintained by a method of varying distributing rotor speed automatically in relation to the fire bed resistance on the front and rear sections of the stoker.

D-C POWER AT

Lowest cost ever

WITH NEW G-E PUMPLESS RECTIFIER

The first large (750 kw and above) rectifier without a vacuum pumping system

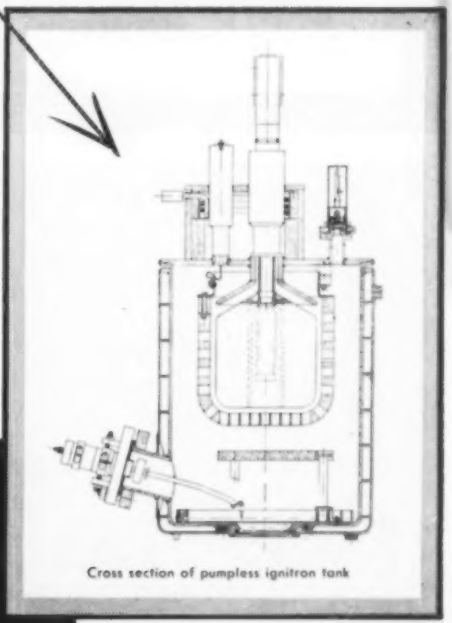
IT GIVES YOU

Improved Performance at full or partial load with low no load losses, no vacuum-pump losses.

Lower Maintenance Cost—manifolds and pumps are eliminated, fewer rotating and moving parts to replace, momentary overloads easily and safely handled.

Easier Installation with inter-connections furnished is a new packaged design with size and weight slashed. Up to 25% savings in installation costs.

You can cut your power bills with G-E Mercury Arc Rectifiers. Call or write your nearest G-E sales office for information. Apparatus Department, General Electric Co., Schenectady 5, N. Y.



Cross section of pumpless ignitron tank

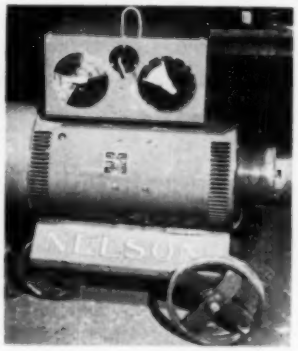
GENERAL ELECTRIC

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

Special Power Units

M-8 NELSON STUD WELDING DIVISION, MORTON GREGORY CORPORATION, Lorain, Ohio, has developed two special power units specifically designed for use with the company's stud welding equipment.



One unit is a motor operated generator set (illustrated) capable of welding studs up to and including ⅝" in diameter. The other is a specially designed battery-operated unit which can be used for installing studs up to ½" in diameter with the Nelson automatic stud welding gun.

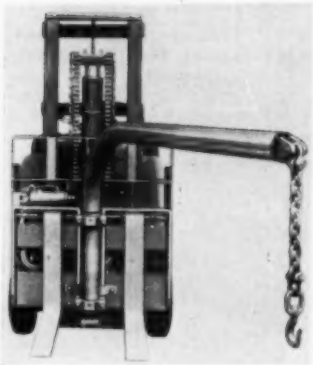
The manufacturer states that the power unit is comparable in size to a 200 amp welding generator and weighs approximately 800 lb. Either 220 volt or 440 volt, 60 cycle alternating current can be used with it.

The battery unit, requiring only a 110 volt a-c outlet for its operation is said to be particularly useful for construction jobs where welding generators or necessary power are not available, and for plant maintenance operations. This unit consists of twelve 6 volt, 150 amp wet storage batteries mounted on a frame and covered with a hood. Wheels are optional equipment. An automatic battery charging device is mounted on top of the hood.

◆

Crane Arm

M-9 TOWMOTOR CORPORATION, 1226 East 152nd St., Cleveland 10, Ohio, has developed a slewing crane arm which is said to permit rapid, easy positioning in freight cars of loads up to 800 lb



at 80" load center. The crane arm is pivoted so that a two-way hydraulic cylinder can swing it laterally 20 degrees to either side of center. The slewing crane arm is readily detachable so that the truck can be used with standard pallet forks.

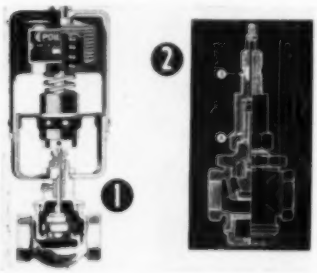
◆

Control Valve

M-10 THE POWERS REGULATOR COMPANY, 2720F Greenview Ave., Chicago 14, Ill., is producing a new air operated control valve for regulating flow of steam, water, oil, or gases. The valve, known as the "Metaflow" is diaphragm operated for pressure differentials below 75 psi. It is available in sizes ½" through 2", standard valve or packless valve body.

Housing is aluminum alloy. Adjusting screw is brass with rustproofed steel spring having 15 lb adjustment range to give proper sequence operation where required. Bonnet assembly consists of polished stainless steel stem in preformed lubricated metallic packing.

Valve bodies are bronze with screwed ends, maximum body pressure 125 lb. Packless valve prevents leakage of inflammable or harmful liquids or gases and provides vacuum protection. Packless valves are suitable for use with Freon, oil, gasoline, non-corrosive gases, hot or cold water, and low pressure steam.



Multi-Purpose Drill

M-11 GARDNER-DENVER COMPANY, Quincy, Mass., has recently announced a new, lightweight utility drill for plant maintenance crews. The drill comes in a

convenient carrying case with a complete kit of drill accessories, including a 14-in. drill steel and three assorted-size rock bits, a star drill adapter, and 25 ft of air hose.

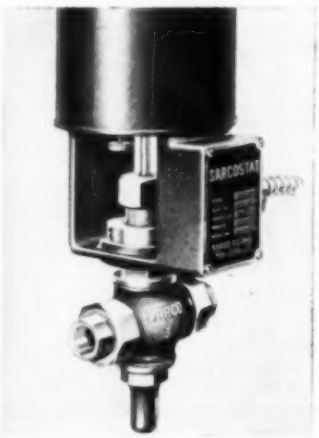
◆

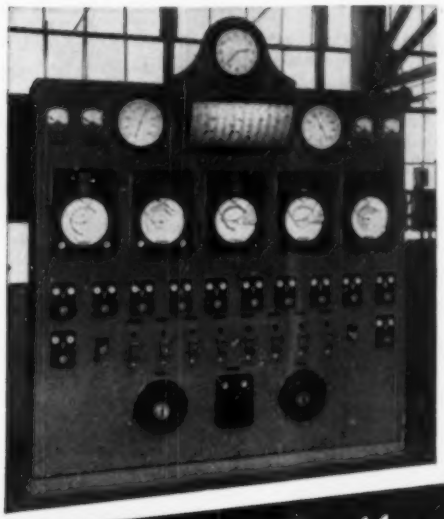
Hydraulic Motor Valve

M-12 SARCO COMPANY, INC., 350 Fifth Ave., New York 1, N. Y., has introduced a new electro-hydraulic motor valve for open-and-shut control, two-wire, normally closed, for direct connection to 110 volts a-c, 60 cycle current.

This valve is designed for automatic operation by thermostats or pressurestats or by liquid level or flow controls. As a shut-off valve in an inaccessible location, it can also be actuated by a push-button.

The valve operator, actuated by hydraulic power, operates single seated valves up to 1½" or double seated valves up to 4" at 125 psi, by direct thrust—without resort to pilots, gears, or levers.





This Bailey Boiler Control Panel in a mid-western industrial plant saves fuel and insures safe operation of a 100,000 lb per hr, 175 psi, sat., pulverized coal and gas-fired boiler.

What's Your Control-Dollar Efficiency?

Control-dollars frequently bring annual investment returns of 100% or more. When you buy adequate, well-applied steam plant controls, you increase your dollars' ability to work usefully for you.

That's where Bailey can help: Bailey Controls can give you a better control-dollar efficiency. Here's why:

1. **Complete Range of Equipment—fully co-ordinated.** You need never worry that a Bailey Engineer's recommendation is slanted in favor of a particular type of equipment, just because he has a limited line to sell—or that Bailey will pass the buck for efficient control; we offer *complete* boiler control systems.

2. **Engineering Service—backed by experience.** No other manufacturer of instruments and controls can offer as broad an experience, based on successful installations involving all types of combustion, flow measurement and automatic control.

3. **Direct Sales-Service — conveniently located near you.** Bailey Meter Company's sales-service engineers are located in more industrial centers than those of any other manufacturer of boiler control systems; you get prompt, experienced service with a minimum of travel time and expense.

•

For better control-dollar efficiency—for more power per fuel dollar, less outage and safer working conditions, you owe it to yourself to investigate Bailey Controls. Ask a Bailey Engineer to arrange a visit to a nearby Bailey installation. We're proud to stand on our record: "More power to you!"

A-112-1

BAILEY METERS

BAILEY METER COMPANY

1028 IVANHOE ROAD
CLEVELAND 10, OHIO

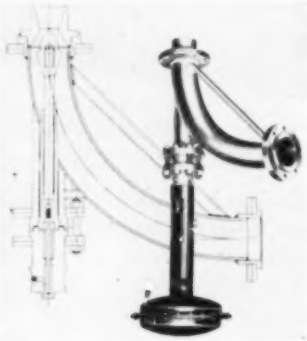
Controls for Steam Plants
COMBUSTION · FEED WATER
TEMPERATURE · PRESSURE
LIQUID LEVEL · FEED PUMPS

Long Sweep Angle Valves

M-13 HAMMEL-DAHL Co., 243 Richmond St., Providence 3, R. I., has announced the production of long sweep angle valves to answer the problem of handling slurry and those liquids which must have a minimum of turbulence in the valve body.

The valve body is a long radius bend. It can be fabricated from any type pipe which can be bent and welded.

The valve plug is streamlined to offer minimum flow resistance to fluid passing through the valve. The plug guide is extremely long to assure ample guiding of the valve plug even where it is operating very close to the seat. Valve plugs are of the high lift type, normal lift being ½ the nominal valve size.



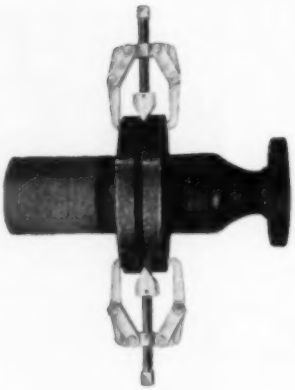
The seat is designed as a section of a Venturi throat, assuring minimum turbulence in the seat section. The Venturi seat is built as one piece and is the retained type. Conventional seats are threaded and screwed into the valve body. Retained seats, however, have no threads, but are lapped into the valve body and retained by the compression of the line bolting.

Valve body bonnets are normally provided of solid barstock. The bonnet is retained by through bolted construction. Long sweep angle valves can be provided in any size from 2" to 6".

◆

Pipe Flange Spreader

M-14 OWATONNA TOOL COMPANY, 390 North Cedar St., Owatonna, Minn., has introduced a pipe flange spreader to remove an old gasket when necessary to install a new one.



Two Grip-o-matic Pullers combine to accomplish the job with two removable wedges on the forcing screws to spread the pipe flanges. The jaws are hoked into the bolt holes with the tols opposite each other and the forcing screws are turned alternately to spread the flange uniformly.

The tools are useful in utility plants, refineries, mills, and other industrial plants.

FREE READER SERVICE

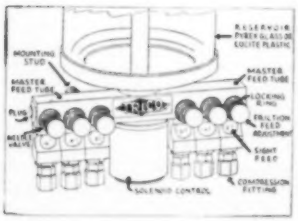
To obtain free information on this equipment, circle number on the page 17 free post card.

Multiple Feed Oilers

M-15 TRICO FUSE MFG. CO., North Fifth at West Chambers, Milwaukee 12, Wis., has announced the production of automatic solenoid or manual control multiple feed oilers for industrial applications.

Oil is fed by gravity from a large reservoir through individually adjustable needle-valves and through copper or Neoprene tubing to the various bearings. When solenoid, located directly below reservoir, is energized, oil feeds to all lines, and stops feeding when current is shut off. The oiler can be operated from any convenient current outlet or connected directly across motor starting switch to feed automatically when starting, or stop feeding when equipment is not in operation.

The manual control type has a shut-off lever at top. Supply of oil remains in the master tube at a constant level



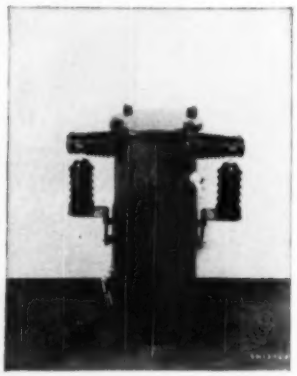
with needle-valve port holes for instant feeding when starting. Sight feed fittings show the amount of oil being fed to bearings. Individual feed lines are provided with vibration and leakproof friction fit needle-valve adjustments, permitting independent regulation. Locking arrangement prevents change of adjustment because of vibration or tampering.

The complete solenoid type oiler with six outlets measures only 6" wide by 9⅞" high.

◆

Transformers

M-16 WESTINGHOUSE ELECTRIC CORPORATION, P. O. Box 2099, Pittsburgh 30, Pa., has developed CSP distribution transformers with cylindrical tanks, wall-mounted primary bushings, and externally mounted lightning arresters, available in ratings below 5,000 volts.



The transformers are cylindrical with no overhanging hood. Space required on the pole is decreased so that more climbing space is available. The breaker operating handle is mounted between one of the primary bushings and the pole bracket so that the operating handle is accessible without reaching around a primary bushing or arrester. The completely round tank and cover insure more effective gasketing and sealing of the transformer.

Improved-type lightning arresters are mounted on the outside of the tank. A series air gap isolates the arrester from the line both electrically and mechanically. Radio interference problems are said to be practically eliminated through use of this gap.

High-voltage bushings are mounted directly in the tank walls. High-voltage line leads can be connected to the terminals without the use of tools. A hand-operated insulating knob tightens a mechanical connector which will accommodate from number 8 solid to number 2 stranded AWG conductors.

FREE READER SERVICE

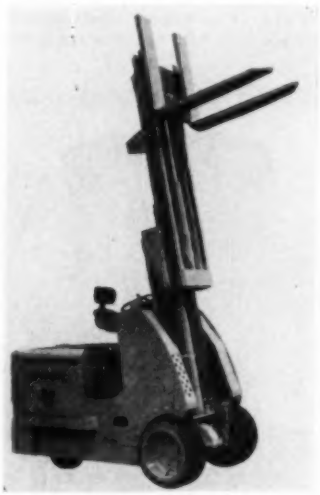
To obtain free information on this equipment, circle number on the page 17 free post card.

◆

Industrial Trucks

M-17 AUTOMATIC TRANSPORTATION Co., 149 West 87th St., Chicago, Ill., has added three medium capacity sit-down model electric industrial trucks to its Skylift line.

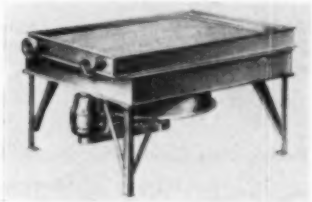
The new trucks are rated for 4,000, 5,000, or 6,000 pound loads. They are designed for the type of operation in which the driver remains on the truck almost constantly.



Design features include the location of all electrical controls in a single enclosed panel on the dashboard; tiering to 124 inches despite collapsed mast height of only 83 inches; use of a new control system which, combined with silicone insulation, affords protection for the motor; and a tilt ram with construction designed so that the packing automatically compensates for wear. New trailing axle permits lower mounting of battery and seat, decreasing gravity and increasing truck stability.

Dry Cooling Equipment

M-18 THE MARLEY COMPANY, INC., Fairfax and Marley Roads, Kansas City 15, Kans., have added three new models to their line of dry cooling equipment. Two of the



models are small portable units, while the other is designed to fill the need for a medium size unit. Although designed primarily for cooling engine

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STATEMENT

of the ownership, management, and circulation required by the Act of Congress of August 24, 1912, as amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code Section 233) of SOUTHERN POWER AND INDUSTRY, published monthly at Dalton, Georgia, for October 2, 1950.

State of Georiga, County of Fulton, s.s.

Before me, a Notary Public, in and for the State and County aforesaid personally appeared E. W. O'Brien, who having been duly sworn according to law, deposes and says that he is the Managing Director of SOUTHERN POWER AND INDUSTRY, and that the following is to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form to-wit

1. That the names and addresses of the publisher, editor, managing director and business manager are: Publisher, W. R. C. Smith Publishing Co., Atlanta 5, Ga.; Editor, Francis C. Smith, Atlanta 5, Ga.; Managing Director and Business Manager, Eugene W. O'Brien, Atlanta 5, Ga.

2. That the owners are W. R. C. Smith Publishing Co.; Estate of W. R. C. Smith, Atlanta, Ga.; O. A. Sharpless, Atlanta, Ga.; J. C. Cook, Chicago, Ill.; W. J. Rooke, Atlanta, Ga.; T. W. McAllister, Windemere, Fla.; E. W. O'Brien, Atlanta, Ga.; Seba J. Jones, Atlanta, Ga.; Mrs. E. L. Philpot, Atlanta, Ga.; Richard P. Smith, Atlanta Ga.; A. P. Roberts, Atlanta, Ga.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or any other security holders are: None.

4. That the two paragraphs next above giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholders or security holders appear upon the books of the company as trustees or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds, or other securities than so stated by him.

E. W. O'BRIEN, Mg. Dr.

Sworn to and subscribed before me this 2nd day of October, 1950.

SEBA J. JONES, Notary Public

My commission expires Feb. 23, 1954.

jacket water, they can also be used for cooling natural gas, lubricating oils, chemical solutions, fluids or refining stages, ammonia or steam condensing.

The portable units are both forced draft and have the same cooling capacity. Model L, however, has the fan and tube sections mounted vertically, while Model M has them mounted horizontally. There are seven different sizes of each model. The other model units are larger in capacity, and are also forced draft, with horizontally mounted sections. The four sizes of this model supplement the heavy-duty application dry coolers.

Standard sections of these units are made of round copper tubes with pressure-bonded aluminum or copper fins, brazed into formed steel pipe headers. They are designed to operate up to 150 psi at 300 F.

Dimensions and weights on the new models, as well as rating tables for cooling water, are given in the manufacturer's Bulletin DC-50.

◆

Pipe Couplings

M-19 MORRIS COUPLING AND CLAMP COMPANY, 1399 Beaver Ave., Ellwood City, Pa., has announced availability of pipe couplings for pipe sizes up to 8 inches. In addition to the standard zinc coated steel line, all aluminum couplings are available in all sizes to 8 inches.

The couplings are used for permanently joining either plain end or threaded pipe or a combination of the two. The pipe coupling is of a compression band type and serves to hold the entire surface of the joint in compression. It is said to be easy to apply with a socket or crescent wrench and gives each joint a pipe union.

Morris couplings are used on oil, gas, water, steam, air, sewage, irrigation, and conduit lines. Rubber base gaskets are standard equipment, but

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

other gaskets such as cork, fibre glass, and neoprene are also available.

◆

Underground Conduit for Steam

M-20 WATER-TIGHT UNDERGROUND CONDUIT, Houston, Texas, has announced a new system for the conveyance of heated and cold vapors and liquids in an underground location. While the development is listed as new, it has seen considerable service during the last six years on one of the military bases in South Texas coastal areas.

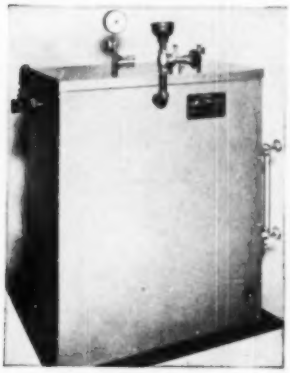
The system consists of an interior pipe supported at regular intervals by a patented refractory support to separate it from the exterior casing. An imbedded steel plate in the refractory support permits welding the supports to the interior pipe, fixing it in position where it is always in place and will not disrupt pipe insulation by expansion. On tubing products, usually insulated with cork, or some other type of covering, the steel plate is omitted and a refractory support with the proper sized opening is furnished.

At each quadrant of the refractory supports, semi-circular openings are provided. The three upper openings serve to ventilate the system, and the bottom opening serves as a drain.

The outside casing is a pressure pipe, of compressed cement-asbestos construction, tested to high internal pressure and beam-tested during manufacture. Rubber rings used as coupling seals will withstand an internal pressure of 500 lb.

Electric Steam Boilers

M-21 LIVINGSTONE ENGINEERING COMPANY, 100 Grove St., Worcester, Mass., has announced a lower priced line of electric steam boilers.



This new model has a maximum working pressure of 50 psi and is available in standard sizes from 3 boiler horsepower to 25 boiler horsepower. It can be operated on 220, 440, or 550 volts, single or polyphase.

The boiler, known as Speedylectric "400", is finding applications in process heating of plastic presses, jacketed kettles, sterilizers, autoclaves, pressing machines, pellet mills (feed-stuffs), rubber rolls, degreasers, and other steam using equipment.

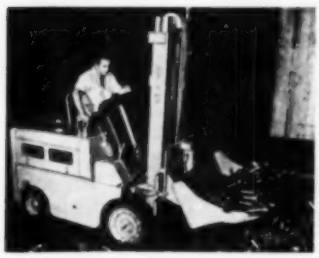
◆

Fork-Shovel Attachment

M-22 The INDUSTRIAL TRUCK DIVISION of the CLARK EQUIPMENT COMPANY, Battle Creek, Mich., has developed a heavy-duty fork-shovel attachment for lift trucks, with 7¾-inch tines. The attachment is useful in handling many loose materials, such as castings, forgings, coal, coke, and broken stone.

The hydraulically controlled shovel can be tilted up to 40 degrees above horizontal, including 10 degrees tilt of the upright assembly, which permits it to scoop up maximum loads without having to ram the stock pile.

Hydraulic controls ease the dumping action to minimize shock and strain on the upright assembly. Dumping angle is 48 degrees. The fork-shovel need not be lowered to the ground in order to return it to horizontal position.



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Gas Burner Safety Device

M-23 COMBUSTION CONTROL CORPORATION, 77 Broadway, Cambridge 42, Mass., has introduced Fireye System FF-6 providing electronic flame failure protection and semi-automatic ignition control for all types of commercial and industrial gas burning equipment.

The flame rod is mounted near the gas pilot on the burner plate and projects into the fire chamber, so that its tip impinges on the pilot or main gas flame. It is wired to the control which may be located at any convenient point such as on the burner panel board.

When flame fails, the flame rod signals this condition to the control which instantly cuts off fuel and can be wired to sound an alarm. The new device responds to the flame itself, not to a secondary effect of the flame.

CATALOGS AND BULLETINS

These free and helpful booklets are available for the asking.
Circle numbers desired on the page 17 service coupon post card.

B-10 FLOOR HARDENER — Bulletin, 4 pages—"Flin-crust Liquid" concrete floor hardener for use on new or old industrial floors is described. Directions for application are outlined, and chemical properties are discussed.—FLEXROCK COMPANY, 3645 Filbert St., Philadelphia 4, Pa.

B-11 STEAM CONDENSERS—Catalog No. 410-1, 8 pages—Prepared for personnel designing or operating power plants. Describes a patented "Self-Cleaning" Reverse-Flow condenser for power plant service. Illustrated with photographs, line drawings, and diagrams.—C. H. WHEELER MFG. CO., 19th St. and Lehigh Ave., Philadelphia 32, Pa.

B-12 STOKERS—Bulletin No. 501, 16 pages—"The Stowe Stoker Story . . . what they do and where they are doing it", describes the stoker a design and operating features, including a cut-away sectional view showing the type of fuel bed produced. Recent installations are described and illustrated with photographs.—THE JOHNSTON & JENNINGS COMPANY, Attn: Mr. Harry C. Huston, Sales Mgr., Stowe Stoker Div., 877 Addison Road, Cleveland 3, Ohio.

B-13 IDUSTRIAL INSTRUMENTS—Bulletin WG-1823, 20 pages—Describes liquid level indicators and auxiliary attachments for remote indication of liquid level in boilers, feedwater heaters, storage tanks. Construction and operation, installation suggestions, dimensions, application diagrams, pictures of typical installations, how to specify and order, list of users, are included.—YARNALL-WARING COMPANY, Mermaid Lane, Chestnut Hill, Philadelphia 18, Pa.

B-14 SPEED REDUCERS — Engineering Bulletins 1110, 1115, 2105, 2110, 22 pages each—Illustrate and describe the Falk parallel shaft speed reducer and the right angle speed reducer (both horisental and vertical), designed for a wide variety of power transmission requirements in general industrial use.—THE FALK CORPORATION, Milwaukee 8, Wis.

B-15 MATERIALS HANDLING—Folder, 4 pages—"4-Way Pallets" illustrates and describes types of pallets available and their application in materials handling operations.—PALLET LICENSING CO., 795 Boylston St., Boston 16, Mass.

B-16 PROCESSING EQUIPMENT—Bulletin 828, 12 pages—Metal Turnings Crushers designed for reducing large capacities of steel turnings for handling by conveyors are described, and their operation is explained. Sizes, capacities, weights, speeds and power when reducing steel turnings are listed in table form.—THE JEFFREY MANUFACTURING CO., 898 North 4th St., Columbus 16, Ohio.

B-17 ELECTRICAL TAPE — Brochure, 4 pages—"Scotch" brand electrical tape No. 22 to protect pipelines against corrosion by water, salt water, acids, alkalies, and soils, is described. Applicational photographs are included. Tables outline the tape's chemical, physical, and electrical properties.—MINNESOTA MINING AND MANUFACTURING CO., 900 Fauquier Street, St. Paul 6, Minn.

B-18 RECORD CONTROL—Catalog KD 462, 80 pages—"Kardex Visible Record Control" is a comprehensive presentation of all phases of the Kardex visible control principle, prepared for use by those interested in maintenance of business records and effective administrative control. Cabinets and complete equipment are described and illustrated.—REMINGTON RAND INC., 315 Fourth Ave., New York 10, N. Y.

B-19 POWER FACTOR — Leaflet No. 05B7465, 4 pages—"Power Factor Correction Through Use of Synchronous Motors and Condensers" contains examples of basic considerations in the improvement of system power factor and discusses economic and operational advantages.—ALLIS-CHALMERS MFG. CO., 954 S. 70th St., Milwaukee, Wis.

B-20 WORM GEAR DRIVES—Book No. 2324, 80 pages—Describes and illustrates worm gear drives of three basic types, each available in 10 different sizes, for fractional or large horsepower, and in speed ratios of 3½ to 1 up to 8000 to 1. Typical drive problems and their solutions are discussed.—LINK-BELT COMPANY, 307 N. Michigan Ave., Chicago 1, Ill.

B-21 FEEDWATER TREATMENT—Bulletin W-212B7, 6 pages—Discusses development, filtration, backwash water, direct contact vent condenser, complimentary recirculation, backwashing, proportionate sludge removal, and application of the "Hot-Z" system for treating boiler feedwater.—WORTHINGTON PUMP & MACHINERY CORP., Attn: R. E. Coeyman, Adv. Dept., Harrison, N. J.

B-22 PUMP AND MOTOR — Bulletin 52B6140B, 6 pages—Design and construction features of a close-coupled pump and motor known as the "Electrifugal Pump" are described. Styles available are illustrated.—ALLIS-CHALMERS MFG. CO., 954 S. 70th St., Milwaukee, Wis.

B-23 ROLLER CHAINS AND PARTS—Folder F 57-50, 4 pages—Gives a complete description of all Morse factory-packaged chains and parts together with list prices.—MORSE CHAIN COMPANY, 7601 Central Ave., Detroit 8, Mich.

B-24 TEMPERATURE CONTROL—Bulletin No. 101, 24 pages—"The Design and Process Engineers Guide to Industrial Temperature Measurement and Control" defines types of control systems and guides the engineer in selecting the most appropriate one for his plant.—THE PARTLOW CORPORATION, New Hartford, N. Y.

B-25 FLOOR PLATE—Booklet X, 8 pages Describes "Algrip" an abrasive rolled-steel non-skid floor plate for use in industrial plants. Contains helpful fabricating data and charts on maximum sizes and load carrying capacity.—ALAN WOOD STEEL COMPANY, Conshohocken, Pa.

B-26 LIQUID CONTROL—Leaflet, 4 pages —The "Xacto Meter" Figure 460, a new 2-in. meter for industrial liquids and petroleum products, is described and illustrated. Specifications, dimensions and weights are included.—BOWSER, INC., Fort Wayne, Ind.

B-27 HYDRAULIC CYLINDERS—Catalog No. 233-A, 28 pages—Contains illustrations, specifications, design, construction and operation features, and suggestions for uses of Hanna high pressure hydraulic cylinders. — HANNA ENGINEERING WORKS, 1764 Elston Ave., Chicago, Ill.

B-28 MATERIALS HANDLING—Catalog, 36 pages—Presents the entire line of Rapistan industrial casters, platform trucks, and hand trucks, with specifications and illustrations.—THE RAPIDS STANDARD COMPANY, INC., Dept. CT50, 342 Rapistan Bldg., Grand Rapids 2, Mich.

B-29 PRESSURE BLOWER—Catalog No. 500-1, 20 pages—Describes and illustrates Moore Class 2000 pressure blowers for use on cooling towers, both forced and induced draft, and in all types of duct installations where large quantities of air are required under static pressures up to 4 inches H.O. Engineering diagrams are included.—THE MOORE COMPANY, 800 South Missouri, Marceline, Mo.

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The Advertiser's Index is published as a convenience, and not as a part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert.

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BUSINESS—EMPLOYMENT—EQUIPMENT—PROFESSIONAL CARDS—OPPORTUNITIES

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"For Sale," Agents Wanted, and all other advertisements using bold face type or otherwise displayed, $6.00 per column inch per insertion.

Rates for larger spaces furnished on application

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"Position Wanted" advertisements, 5 cents per word per insertion. Minimum charge $1.00. Payable in advance.

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Twenty-five years experience, plant maintenance, operation modern power plants, refrigeration, air conditioning and water filtration plants. Fifteen years high pressure plants, some design and construction experience. Desire supervisory-engineer position with a utility, industrial plant or municipality. Registered engineer. Will relocate or travel.

Write Box 161, Southern Power & Industry, 806 Peachtree St., N. E., Atlanta 5, Georgia.

EXCELLENT POWER UNITS

2—125 KVA Westinghouse AC generators, 440 Volts, 277 RPM. Powered by 2 Bruce MacBeth gas/gasoline engines. For immediate sale from Dallas plant changing products.

A A A IRON & METAL CO.
Canton and Hawkins Sts. Dallas, Texas

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1—No. 52-S-1 Pacific Low Pressure Steel Boiler for Stoker Firing. S.B.I. rating 12,150 sq. ft. 715 sq. ft. heating surface. Six years old, excellent condition. Call or write the Mutual Mfg. & Supply Co., 2933 Spring Grove Ave., Cincinnati 25, Ohio.

WANTED

60 hp high speed steam engine, for 125 lbs. steam. Prefer high speed with fly wheel governor. Give full description.

CRYSTAL ICE WORKS, INC.
BARTOW, FLA.

BOILERS SAVE 50%

2 ea. Kewanee Firebox Boilers, No. 590, 125 lb SP; 304 HP (oil or gas), 2500 Hfs, built 1940, good as new.

1 ea. Titusville 2-pass 55HP, 125 lb WP, built 1942, with all fittings. Excel. Cond.

2 ea. Erie City Economic 2-pass, boilers built 1942, oil burners, smokestack, return system, fittings. Complete room.

MANY OTHER HIGH QUALITY BOILERS IN STOCK. ALSO HOT WATER GENERATORS WITH COPPER COILS. S. I. JAFFE, BOX 4111, PHONE 9-6000, MEMPHIS, TENN.

POWER PLANT ENGINEERS

Applications wanted from men 35 to 45 years of age, who are available for inspection work in various parts of the U. S. Our inspection work is confined to boiler and machinery lines and we require a minimum of 5 years experience in operation or maintenance of boiler and pressure vessel equipment or of power plant equipment. National Board Commission required for boiler applicants. Write qualifications including territorial preference to PERSONNEL DIVISION, 60 Batterymarch St., Boston, Mass., MUTUAL BOILER & MACHINERY INSURANCE COMPANY.

FOR SALE

F. O. B. Jackson, Mississippi, on foundation, complete direct current power plant consisting of:

2—Skinner Universal Unaflow Engines

2—250 K. W. General Electric 240 Volt Generators

2—Balance Sets

1—Switchboard with circuit breakers and metering equipment.

For information, contact E. Bill Green, General Manager, Hotel Edwards, Jackson, Mississippi.

YOUR ADVERTISEMENT ON THIS PAGE

HAVE you some equipment, new or second hand, which you wish to dispose of? Do you desire a good man to fill a vacancy in your plant? Do you desire a position? Do you desire your business or professional card placed before the power, industrial and refrigeration fields?

Why not try an advertisement on this page of SOUTHERN POWER & INDUSTRY with its 15,500 copies per month? SOUTHERN POWER & INDUSTRY reaches the active executives and managers, superintendents, heads of departments and engineers,—the men directly in charge of plant process, the men who buy or dictate the buying of machinery, equipment and supplies.

Advertising on this page produces results at small cost. Note the rates above and tell us what you wish to advertise.

SOUTHERN POWER & INDUSTRY

806 PEACHTREE ST., N.E. **ATLANTA 5, GEORGIA**

Index of ADVERTISERS

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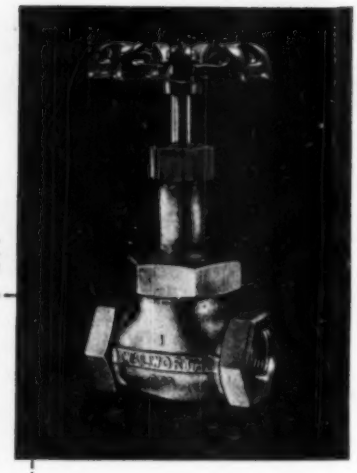
IDENTIFICATION DISC: An aluminum marking plate on all Walworth No. 225P's facilitates inventory control and makes reordering quick and positive.



take a good look at the Walworth "500 Brinell" no. 225P Globe

NEWLY DESIGNED HANDWHEEL: Patented air-cooled, finger-fit handwheel affords sure grip even with greasy gloves.

– the Toughest Bronze Valve Your Money Can Buy

The stainless steel, corrosion resistant seats and discs are heat treated to a hardness of 500 Brinell – hard enough to scratch glass and crush nails! The valve can be closed on sand, slag, and pipe scale without injury to the seating surfaces. "Wire drawing" is practically eliminated. All parts are accurately machined and gaged. Years of tight, positive shut-off are assured.

Available in both globe and angle types (angle type: No. 227P) in sizes ¼" to 2", this quality valve is recommended for 350 lbs. W.S.P. at 550 F, and 1000 lbs. non-shock service on cold water, oil, gas, or air.

For full data on this long-life, economical Walworth Bronze Valve, see your local Walworth distributor, or write for Circular.

IMPROVED PACKING: Molded packing of lubricated asbestos reinforced with copper wire. Suitable for practically every service. Valves can be repacked under pressure when fully opened.

note these 7 Great Features

HEXAGONAL UNION BONNET CONNECTION, DEEP STUFFING BOX AND RUGGED STUFFING NUT: Union bonnet connection eliminates any chance of distortion or leakage even though valve is repeatedly taken apart and reassembled.

OVERSIZE STEM: The high-tensile strength silicon-bronze stem assures long life and protection against wear.

SEATS AND DISCS: Plug type seats and discs of stainless steel, heat-treated to 500 Brinell hardness and machined simultaneously to a mirror-like finish, with accurate tapers assures tight positive shut-off with minimum handwheel effort.

EXTRA STRONG BODY: Made of Composition M (ASTM B61) bronze. Thick walls and rugged hexes provide a high safety factor. Valves undergo hydrostatic shell test of 1,000 psi.

WALWORTH

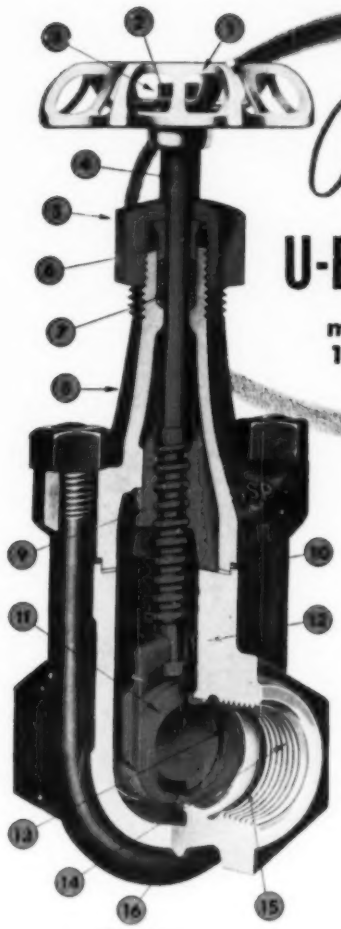
valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Only Jenkins U-BOLT GATES

measure up to this 16-point standard

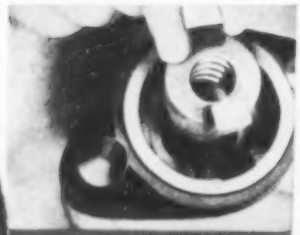


1. Perfect-Grip Handwheel
2. Valve Index Plate
3. Secure Wheel Nut
4. Heavy Manganese Bronze Spindle
5. Large Packing Nut
6. Self-centering Packing Gland
7. Deep Stuffing Box
8. Heavy Duty Bonnet
9. Unique Renewable Bonnet-Saver Bushing
10. Body-Bonnet Safety Joint
11. Extra-Wide Gauge Reversible Bronze Wedge
12. Heavy-Duty Body
13. Bronze Seat Rings, Expanded In
14. Full Length Pipe Threads
15. Liberal Diaphragm Clearance
16. Strong U-Bolt

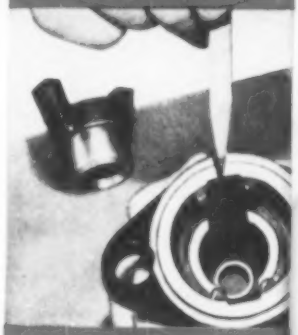
PRESSURES

Screwed	Flanged
150 lbs. Steam	125 lbs. Steam
225 lbs. O.W.G.	175 lbs. O.W.G.

Bronze Mounted or All Iron—Sizes ¼" to 3"



BONNET SAVER BUSHING — No need to junk the bonnet when operating threads are worn. Just slip in a new, patented "Bonnet-Saver Bushing" and have good-as-new thread engagement.



EASY TO CLEAN — You can readily get into the bonnet of this valve to clean out the chamber above the operating threads.

RUGGED CONSTRUCTION — Here's proof. When the U-bolt nut was tightened down with a 14" socket wrench until the high tensile steel bolt broke, the heavy duty body and bonnet did not crack!

TROUBLE IS RULED OUT! Check these 16 advanced features—for wear-resistance . . . for ease of maintenance. From handwheel to diaphragm, notice how thoroughly trouble has been ruled out in designing this U-bolt valve. No other valve in its class measures up to Jenkins U-bolt Gate on all these points, many of them exclusive.

You can take it apart and put it together again in two minutes, and it's a cinch to clean. When operating threads become worn, just slip in a new "Bonnet Saver Bushing" and restore it to new-valve efficiency. It's a favorite for those plumbing-heating, mine, mill or any services where excessive sediment is tough on valves and where freezing is a hazard.

For "renewability" without waste, bull-necked endurance, and low upkeep cost, you can't beat Jenkins U-bolt Valves. Yet they cost no more! Full details and specifications in new circular, Form 179-B. Jenkins Bros., 100 Park Avenue, New York 17. Jenkins Bros. Ltd., Montreal.

Sold through leading Industrial Distributors

JENKINS VALVES

LOOK FOR THE DIAMOND MARK

SINCE 1864 — TRADE JENKINS MARK

DOWELL SERVICE

CHEMISTRY APPLIED TO MAINTENANCE CLEANING PROBLEMS

A Power Company asked: "Can you help us stop tube failures?"

Dowell Service provided a fast, effective solution!

A midwestern power and light company, operating 350,000 lb. per hour steam generators, was having numerous unscheduled shutdowns because of tube failures. Although tubes were turbined periodically and inspections showed that deposits were small in amount, tubes continued to blister. A crisis was reached when 11 outages occurred in 18 days!

Dowell Service provided the answer with a *more effective, faster and more economical* method of maintenance cleaning. Tube failures at this power house have been practically eliminated. A regular cleaning schedule using Dowell Service has solved similar problems in many other plants.

What is Dowell Service? Experienced engineers fill the equipment to be cleaned with special liquid solvents designed to dissolve and disintegrate the profit-stealing deposits from all surfaces, even the most complex, *in a few hours.* The solvents are carried to the job in Dowell pump trucks and are pumped into the unit through regular connections. There is no dismantling.

Call Dowell for consultation on your cleaning problems. A Dowell engineer is as near as your telephone. No obligation, of course.

Other recent Dowell jobs:

Anthracite filters cleaned by Dowell Service in one working day. Backwash rate increased from 75 to 385 g.p.m.

★

Five air conditioning compressors cleaned for office building in 8 hours by Dowell Service. Result: $15.70 per day saved on power demand.

★

Two 40,000 lb./hr. boilers cleaned for paper company in 24 hours. Result: 37 tons of fuel per day saved under same load conditions.

CALL

DOWELL INCORPORATED - TULSA 3, OKLAHOMA

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DOWELL

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